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NAVAL BRIGADE AND OPERATIONS ASHORE

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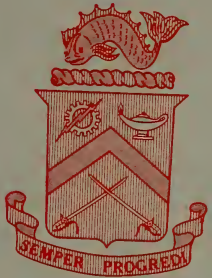

MARINE CORPS
DEVELOPMENT AND EDUCATION COMMAND
QUANTICO, VIRGINIA

Presented by

W. H. RUSSELL

Professor Emeritus, USNA

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NAVAL PROFESSIONAL PAPERS, No. 20.

THE

NAVAL BRIGADE AND OPERATIONS ASHORE.

A HAND-BOOK FOR FIELD SERVICE,

PREPARED

FROM OFFICIAL AND STANDARD AUTHORITIES,

BY

H. K. GILMAN,
FIRST LIEUT., U. S. M. C.

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Navy Department.

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ERRATA.

Page 12, last line, for "assemblying" read "assembling."
Page 33, line 19, for "blunt" read "brunt."
Page 38, line 15, for "purs" read "pursuers."
Page 62, line 36, for "demanded" read "demand it."
Page 70, line 12, for "examing" read "examining."
Page 97, line 3, for "on" read "in."
Page 131, line 9, for "they have" read "it has."
Page 131, lines 17 and 20, for "Creedmore" read "Creedmoor."
Page 164, line 24, for "they lose" read "is lost."
Page 174, line 12, for "breeches" and "errect" read "breaches" and "erect."
Page 181, last line and Fig. 7, for "*pan-coupées*" read "*pan coupés.*"
Page 183, line 29, for "length" read "lengths."
Page 186, line 33, after "about" read "3½," and in last line for "adopted" read "adapted."
Page 191, line 26, for "loose" read "lose."
Page 194, line 13, for "it" read "their," and for "is" read "are."
Page 197, line 10, for "peal" read "peel."
Page 210, line 25, for "horeshoe" read "horseshoe."
Page 234, line 16, for "peal" read "peel."
Page 243, line 15, for "hyperdermic" read "hypodermic."

PREFACE.

The object of this book is to present, in as clear and concise a manner as possible, such military principles and such information as may prove of practical benefit to officers operating ashore with an armed force.

While fully realizing that there are many officers in the service of greater experience, and far more competent to prepare a work of this kind than myself, yet, as no such work has hitherto been prepared, I trust that this one may meet with the approval of, and be of practical benefit to, the service at large.

It is for the most part a compilation from various official and standard authorities, and little claim is made to originality; in fact, much originality in a book of this character would be out of place, and detract from its value as a work of reference.

The excellent article contained in the Ordnance Instructions, U. S. Navy, on landing parties, has been largely used, but a different arrangement given to it and considerable new matter added. The Army Regulations and other official sources have also been freely consulted.

Permission was asked of, and courteously granted by, the following authors and publishers to make extracts from certain of their writings or publications, viz: General Lord Wolseley, R. A.; Captain Bedford, R. N.; General Wingate; Colonel Craighill, U. S. Army; Colonel Laidley, U. S. Army; Captain Collum, U. S. Marine Corps; Captain Blunt, U. S. Army; Lieutenant Farrow, U. S. Army; Lieutenant Regan, U. S. Army; Appleton & Co.; Scribner Bros.

H. K. G.

NAVAL ACADEMY,
Annapolis, Md., March, 1886.

LIST OF AUTHORITIES CONSULTED.

United States Navy Regulations.
United States Army Regulations.
Queen's Regulations, R. A.
Field Exercises, R. A.
Hand-Book for Field Service, R. A.
Regulations and Instructions for Encampments, R. A.
Carnet de l'Officier de Marine.
Infantry Tactics, Upton.
Artillery Tactics, Upton.
Ordnance Manual, U. S. Navy.
Manual of Heavy Artillery, Tidball.
Rifle Firing, Laidley.
Target Practice, Wingate.
Rifle and Carbine Firing, Blunt.
Manual for Army Cooks.
Permanent and Field Ovens, Bell.
Scott's Military Dictionary.
Farrow's Military Encyclopedia.
Farrow's Mountain Scouting.
Manual of Signals, Myer.
Soldier's Hand-Book, Wolseley.
Sailor's Hand-Book, Bedford.
Duties of Guards and Sentinels, Regan.
Outpost, Mahan.
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Science of War, Wheeler.
Special Operations of War, Lippitt.
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Strategy and Grand Tactics, Dufour. (Craighill's Translation.)
Art of War, Jomini.
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Military Lessons, Welcker.
The Prairie Traveler, Marcy.
The Mechanic's and Engineer's Pocket-Book, Haswell.
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Administration of Law and Justice, U. S. Navy.

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Chapter I.

ORGANIZATION AND EQUIPMENT.

ORGANIZATION.

As in nearly all operations in which our naval forces are called upon to take part it is necessary to land men and guns, and as efficiency and success in such cases must always largely depend upon previous organization and drill, these matters are of the first importance, and require special study and attention. The organization in each vessel should be complete, and suited to the capacity of its boats, and, at the same time, such as to permit of the easy and rapid combination of its force with the landing forces from the other vessels taking part in the operations.

In preparing orders for a landing force the following points should be considered:

(1) Number of men to be thrown ashore.

(2) Number of boats available to receive the force, carry the field-pieces, cover the landing party, &c.

(3) What articles each boat is to carry.

(4) Number of men to be carried in each boat.

(5) Where the flotilla formation is to take place, and order of formation.

(6) Officer to command the flotilla; officers to command divisions; officers to command boats.

(7) Number of battalions; strength of each; by whom commanded.

(8) Position of flanking gunboats and covering ships.

(9) When possible, the distance of conspicuous objects ashore from the beach for the benefit of covering ships and boats.

(10) Order of landing; whether to be landed simultaneously or in succession from column or single boats.

(11) Order of formation of the force ashore.

(12) If the skirmishers shall land with their haversacks, &c., or only with their rifles, cartridges, and canteens.

(13) What clothing, cooked provisions, and water each man shall take.

(14) If officers are to carry their own baggage, and if officers' servants are to be under arms.

(15) What boats to carry reserve ammunition, water, provisions, and stores after the landing has been effected, and the officers to take charge of the same.

(16) Arrangements for future supplies and for conveyance and reception of wounded men.

(17) Beach-master and assistants.

The commander of the flotilla and the commander of each battalion should be furnished a copy of the orders in full, and each subordinate officer should receive a written statement of such parts of the orders as refer to him.

These orders should be issued by the senior officer present.

A naval battalion is composed of two elements: (1) the line or the fighting element, and (2) the staff; both are of equal importance, inasmuch as neither can operate without the aid of the other.

The battalion is commanded by the captain of the ship or some officer detailed by him, and has associated with him an adjutant, who acts as his assistant.

The composition of the battalion staff is as follows: (1) a Pioneer Corps (includes Engineer Corps); (2) a Signal Corps; (3) a Medical Corps; (4) a Commissary and Quartermaster Department; (5) an Ordnance Corps.

THE ADJUTANT.

The adjutant is the assistant or aid of the battalion commander.

Upon the formation of the battalion he should transmit to the latter a roster of the officers and men composing the same.

All official correspondence with the battalion commander should pass through the adjutant and all orders issued to the battalion should be authenticated by his signature.

At drills, parades, inspections, reviews, guard-mounting, &c., his duties are as laid down in the Infantry Tactics. (See Chapter V.)

He receives the reports of the company commanders at retreat, tattoo, and reveille, and communicates the general result to the battalion commander. In addition to this he makes out the details for all guards, receives the written morning reports, and from them submits a consolidated report to the battalion commander.

He has associated with him a sergeant-major, who acts as his assistant.

PIONEER CORPS.

Every ship should furnish a pioneer corps at the rate of two men for each landing company.

An officer should be detailed to command them, also to act as the engineer officer of the battalion.

The pioneers should be selected for their intelligence, activity, and reliability.

If possible, one or more of the pioneers should be taken from the carpenter's gang. Each should carry an ax slung in a short canvas bag over his back and such other articles as the circumstances of the case may require. They should be armed with revolvers only.

The pioneer officer should perfect himself in the principles of field fortification and bridge-building. (See Chapters IX and X.)

SIGNAL CORPS.

Every ship should furnish a signal corps at the rate of one man for each landing company.

The corps should be commanded by a commissioned officer, who will be the signal officer of the battalion.

The men should be selected for their truthfulness, intelligence, activity, and general reliability. In addition to the duties of signal-men they may be employed as scouts for the purpose of collecting information.

The signal officer should be a good draftsman and capable of making a reconnaissance as indicated in Chapter XI.

MEDICAL CORPS.

Should be composed of one or more medical officers, an apothecary, and of such stretcher-men and nurses as may be designated; the latter may be taken from the navigator's or powder division.

THE COMMISSARY AND QUARTERMASTER DEPARTMENT.

Should be composed of a paymaster or paymaster's clerk, a pay yeoman or jack of the dust, and such assistants as may be needed. Before leaving the ship a detail of one or more men should be made from each landing company to assist in breaking out stores and issuing same. Such a detail will avoid much confusion.

ORDNANCE CORPS.

Should consist of a commissioned or warrant officer and such assistants as may be required.

A supply boat or raft should be placed under him containing spare ammunition and such other supplies as may be needed.

One or more armorers should accompany the boat with assemblying and repairing tools, spare parts for small

arms, and articles for repairing B. L. R., small-arms, and machine guns.

The ordnance officer is responsible for all ordnance property received by him for use of the battalion.

THE BRIGADE STAFF.

The brigade staff should be selected by the brigade commander, as follows:

One adjutant-general, 1 chief of pioneers (who will act as the chief engineer of the brigade), 1 chief signal officer, 1 chief medical officer, 1 chief commissary and quartermaster, 1 chief of ordnance, and such aides, clerks, or other assistants as may be required.

The duties of the brigade staff are similar to, but more comprehensive than, those of the battalion staff.

They should be held responsible for the efficiency of their various branches, and should from time to time make such suggestions and recommendations to the brigade commander relative to the same as the exigencies of the case may demand.

THE LINE.

The line is divided into two parts: (1) the infantry; (2) the artillery.

Infantry.—From each gun division of the ship let an infantry company be selected, consisting of thirty-six men, two of whom are to be guides and two file-closers, the company being commanded by the division officer, having associated with him the division midshipman.

In all infantry divisional exercises, as soon as the men are fairly proficient, the landing company should be formed and drilled separately from the rest of the division, and those men who do not belong to the company should be drilled as infantry by a junior officer of the division from which the company has been selected.

It is especially important that all officers should be present at the drills of their respective companies.

For convenience, each company should be divided into two platoons, as nearly equal as possible, each platoon having a guide and one file-closer.

The division officer should frequently cause the platoons to be drilled separately, he taking the larger and the division midshipman the smaller one.

He should impress upon each the fact of its independence, and that each is perfectly capable of acting alone without assistance from the other.

For the sake of uniformity the shorter men should be placed in the smaller platoon.

In the company formation the position of the smaller or second platoon would, of course, be on the left of the larger or first platoon, as laid down in the school of the company.

In the boat organization let this company man and arm two of the ship's boats, a platoon to each boat, care being taken, however, not to overload either. The divisional officers should place these men on the thwarts and in other parts of the boats, with reference to their fitness, and in the company the boats' crews should stand together, regardless of size.

Should boats in any case be of sufficient capacity to take an entire company in one boat, it would, of course, be advantageous to do so.

If necessary, the marine guard could, except when landed as skirmishers, be divided into two or more parts and distributed in the boats containing vacancies.

These two boats should be kept together in line of battle, the larger on the right, in natural order, and commanded by the division officer, while the midshipman or other junior has charge of the smaller one. Let the boats hold the same position in the line that the company would occupy in the battalion according to the infantry tactics.

The object of placing a platoon in each boat is to avoid the confusion and delay that usually follows the disembarkation of a naval battalion.

Whenever the battalion of a ship is landed for drill or parade, the company should, if possible, be sent on shore in the boats to which they are regularly assigned. The companies are numbered in succession from the right.

One of the best companies should be assigned as skirmishers, and should be prepared to land in advance of the rest of the battalion, if ordered.

The ship's bugler and the marine music will be sent with the battalion. They should be able to sound the *assembly, retreat, extend, close, commence firing*, and *cease firing*, which sounds the men are to be accustomed to on board ship.

If the men are to be on shore during the night they should have a blanket slung across their shoulders, a haversack with such cooked rations as may be ordered, and a canteen filled with water, tea, or coffee.

Stretchermen and nurses should be assigned to the hospital boat or boats, and when landed must combine under charge of the medical officer.

Spades, pick-axes, scaling ladders, intrenching tools, and other necessary implements should be placed in the supply boat.

The carpenter's gang should be so distributed as to have at least one man in each boat, and, if possible, two in the larger boats.

Four boat-keepers should be appointed to each howitzer boat and two for the others. They should be in excess of the crew.

When arming and equipping boats for other purposes than landing, the same crews should be used. It may, however, be necessary to increase or decrease the number of men herein suggested to be assigned to the various boats. If the former, the increase should (when proper) be taken from the same division as the rest of the crew.

A sufficient number of the regular gun's crew must always be left aboard to make the ship perfectly secure. There should be *at least* one entire division, and the guns must be fully officered. The men remaining on board who belong to gun divisions most of the members of which are away in the boats must be combined to work as many guns as convenient, and must occasionally be exercised thus combined. Sufficient first and second captains must be left aboard to point and fire these guns, the force at which can be made up from such of the powder division as are not required for the supply of the reduced battery.

A platoon as soon as landed will form under its officer and await the arrival of the other platoon. As soon as the latter lands it will form at once, the platoon farthest from the point of battalion formation closing in upon the other. The company at the "assembly" will take its proper place in the battalion.

The platoons will join their respective companies as soon as formed, but the companies will stand fast until the "assembly" for forming the battalion is sounded, when they will proceed as indicated above.

Should delay or accident prevent either platoon from joining the other before the sounding of the "assembly" the one already formed will at once close in to its company position in the battalion. Should the other platoon arrive after the formation of the battalion has taken place, it will, unless otherwise ordered, form in rear of its platoon and act as a *rear rank* until an opportunity occurs for it to take its proper place.

Each battalion of a brigade will form in this manner (the place of formation having been indicated beforehand), and will then be assigned its place in the brigade by aids to the commander-in-chief, unless their position has been previously designated.

Artillery.—The howitzers and machine guns should each

be allowed twenty men. The crews of heavy pivot guns are convenient for this detail, or it may be made from a broadside division. One quartermaster and one quartergunner are to be added. Such crews should man the heavy boats, and should each be commanded by the officer of the pivot gun, or divisional officer of the division from which it is drawn. The first howitzer should occupy the right of the ship's line of boats, the second the left, and so on. The machine guns should be placed according to their range and caliber, either on the flanks or distributed along the line.

The crews of the howitzers and machine guns (omitting the quartermasters and quartergunners) should be united two and two (in the same division when practicable) so as to form an infantry company of forty men for drill or parade; six being file-closers and two guides.

Each piece should be provided with a limber. It might be sometimes impracticable to land them, but when it could be done they would prove invaluable. If a limber is provided, it obviates the necessity of ammunition boxes on the gun-carriage, as these could be carried on the limber; by simply unlimbering, the piece is ready for action—no running to the rear with a couple of heavy boxes. If there is no other means provided to carry ammunition, it would, of course, be necessary to use these boxes in addition to the ones on the caisson. On the other hand, if it is desired to change front or to occupy a new position, it can be done in much less time, and the piece handled with greater ease than by the present method.

A longitudinal box should be fitted in front of each limber for holding spare rifle cartridges, and a couple of axes and spades should be attached to each piece for intrenching purposes.

To every battery of two pieces there should be in addition a caisson and limber, each carrying two boxes of ammunition. The caisson could also carry a spare box of

rifle cartridges. This supply train could be manned by a crew of twenty men, who would act as the artillery reserve. Transportation ashore for the caisson and limber could be made by rafts, catamarans, or the supply boats.

There are few circumstances in which a limber would not be of great practical service ashore.

Each man should be required to learn the duties of the others, and the crew frequently exercised in mounting and dismounting the piece, changing wheels, fitting spare parts, &c. They should be carefully instructed in the principles of gunnery, and made as conversant with the piece as possible.

A correct estimate of distances is particularly essential to the artillerist. Experience shows that where men have been kept aboard ships for any length of time their estimates of distances ashore are very unreliable. (See Chapter VII.)

Companies should be landed as frequently as possible and the battalion at least once a month. In place of dress-parade and reviews ashore there should be battalion, company, platoon, and skirmish drills, particularly the latter.

Each company should if possible learn the bayonet exercise. Besides being useful, nothing can take its place in giving a man confidence in his piece and consequently in himself.

When the battalion is landed for practice the men should, in addition to their drills, be shown how to erect earthworks, rifle-pits, &c., how to pitch a tent, build a simple field oven, &c. (See Chapters VI and IX.)

The pioneer corps should be frequently drilled in throwing up the simple forms of fortifications, the manner of clearing obstructions and placing the same; of building and destroying bridges, &c. As soon as they become reasonably proficient they should be given squads under the supervision of an officer and required to teach them the same, practically if possible.

The signal corps should be exercised as indicated in the chapter on signaling.

One day each month of practical work of this kind would prove most valuable to both officers and men.

Once or twice a year the brigade should be landed and marched inland a couple of miles, and remain encamped for several days. During that time it should receive all the practical instructions suggested for the battalion, besides learning the responsibilities of camp life and the duties of sentinels and outposts. Every precaution should be taken that is usual in an enemy's country, signal stations should be erected, reconnaissances made by officers and scouts, outer lines of sentinels posted at night, &c.

EQUIPMENT AND SUPPLIES.

To insure uniformity and to increase the efficiency of the landing force the following suggestions relative to its equipment and supplies are offered:

Equipment of men.—Each man should be furnished with the following articles:

(1) A haversack containing one large and several small compartments. In one of these compartments should be kept a knife; in a second a stout two-pronged fork; in a third a package of needles, thread, &c.; in a fourth a comb, tooth-brush, and piece of soap. The large one should be reserved for such rations as may be ordered.

(2) A woolen-covered canteen capable of holding about a quart of fluid.

(3) A stout pair of leggins fitted with patent fastenings for lacing. Leggins should also be issued to marines for service ashore with the battalion.

(4) A cartridge belt capable of holding one hundred rounds of ammunition.

(5) A small tin cup and combination plate and frying pan, the former to be attached to the buckle of the haversack, the latter placed inside.

(6) One gray blanket and one rubber blanket. The latter is exceedingly desirable; it can be used as a covering for the blanket, worn as a *poncho* in rainy weather, or made into a shelter tent when otherwise unprovided for. The gray blanket should be folded twice in the direction of its length, placed upon the rubber one, and the whole rolled as tightly as possible and secured with four stops of stout twine. The two ends should then be fastened together and the blanket is ready for slinging. The blanket and canteen should be slung from right to left; the haversack from left to right.

If desired, and no other means of transportation can be had, a change of clothing should be placed inside before rolling.

The haversack, leggins, and cartridge belts should be made of brown canvas and the canteens covered with woolen material of the same color. Brown canvas straps should be fitted to the haversacks, cartridge belts, and canteens.

A chest should be furnished each company aboard ship, in which to keep these articles, and when ordered on active service the number of each man's gun, cartridge belt, haversack, and canteen should be taken. Blank lists for this purpose will be found in the back of the book (see Appendix II).

CORPS DEVICES.

As distinguishing marks the following are suggested:

(1) Crews of rifle batteries, red lozenge, each side 1 inch long, placed 3 inches above right elbow.

(2) Crews of Gatling and machine gun batteries same, substituting a triangle.

(3) Signal corps same, substituting two crossed flags, each 1½ inches long.

(4) Pioneer corps same as for rifle batteries, substituting a square.

(5) Medical corps same, substituting a Geneva cross.

CLOTHING.

As the circumstances may dictate, but blue flannel is the best for general use.

A battalion landing for any length of time should have a supply of spare clothing. This could only be done, however, when transportation was to be furnished. A list of the clothing required should be given each company commander, and he should see that each man of his company possessed the desired articles. All other personal effects than those ordered should be left aboard ship. If necessary, the quartermaster should be directed to carry an extra supply. (For weight of arms, clothing, &c., see Appendix II.)

EQUIPMENT OF OFFICERS.

Officers should be provided with haversacks, canteens, and leggins similar to those furnished the men, a brown canvas cross-belt, fitted to contain cartridges in front, a case behind for maps, writing materials, &c., and at one side a pistol holster, containing a 44-caliber revolver, and at the other a case containing a good field-glass. Swords should not be worn on active service with the battalion.

Officers will find it a great convenience to provide themselves with the following articles, viz: a small combination mirror, pin cushion, and tape measure, a good pocket compass, and a small surgical case containing a dozen vials of medicine, a pair of scissors, pair of tweezers, and a lance.

A dark lantern will oftentimes prove invaluable. The Ferguson patent lamp weighs 1 pound and can be worn on the cap, at the waist, or carried in the hand; it will burn lard, signal, or other mixed oil without a chimney; the flame cannot be extinguished by wind or rain, and is reliable in any weather.

A folding rubber bucket and a rubber basin are very useful and take up but little room. None of these articles are costly. A few of the former supplied to each company would prove a great convenience. [For weight of arms, clothing, &c., see Appendix II.]

PROVISIONS.

Each article of food should be made up into packages, convenient for ready transportation, and the number and kind of ration contained in each should be clearly marked on the outside. If Liebig's extract of beef were added to the ration it would be a great addition, as it is convenient to carry and makes a most excellent and nutritious soup. Tables showing kind and weight of Navy ration will be found in the back of the book (see Appendix II).

COOKING UTENSILS.

Boat stoves should be provided in the proportion of one stove to each company; each stove box should contain a couple of axes. Stoves need not ordinarily be carried, as fire-places can always be built in little time, and will answer the purpose just as well.

Three kettles (fitting one within the other) should go with each stove.

The company cooks (detailed from each company by its commander) should take charge of mess outfit unless otherwise ordered. The officers will furnish their own mess outfit.

Previous to leaving the ship servants should be detailed for the use of officers at the rate of one servant to each landing company.

CAMP OUTFIT, ETC.

Each ship should be supplied with a sufficient number of tents to accommodate its battalion. If no transporta-

tion could be obtained for them and the camp was some distance from the beach, shelter tents could be improvised from rubber blankets or from studding-sails.

There should be stored in the ship a liberal supply of spades, pickaxes, and axes, also a number of serviceable lanterns at the rate of four to each company.

TRANSPORTATION.

The battalion should be landed first in heavy marching order, each man being furnished with one (or more) day's rations. If more supplies were needed certain boats should be designated to transport those required, or rafts could be used, as the landing would, in such cases, usually be made in fair weather.

Where practicable, wagons or carts should be hired by the quartermaster for transportation inland, but when these could not be obtained, the spare limbers could be utilized by removing the boxes, securing two limbers together and placing between a wooden frame (one or more of which should be kept aboard each ship for that purpose).

Such a wagon could carry 2,000 pounds and be easily handled by a gun detachment. In case neither of these methods could be adopted, a detail should be made from each company, previous to leaving the ship, for the purpose of carrying the company supplies. If necessary, a similar detail should be made for the spare ammunition.

An officer should always be placed in charge of the supply and ammunition parties.

FITTING OF BOATS.

All boats should have the means for stopping shot-holes and should carry one or more buckets for bailing.

Large boats should have a grating or plank about 2 feet wide slung on each bow to be on a level with the

water when loaded. They may be turned back close to the bow while *en route* to the beach and just before touching the beach be thrown forward so as to hang horizontally in the slings.

If the landing is to be on mud or deep sand the boats which carry field-pieces should be provided with planks or mess tables for running the guns ashore.

In case all the force cannot be landed at once the boats to return for the remainder should be designated beforehand

CHAPTER II.

LANDING OF NAVAL BRIGADE.

The landing. Orders of battle—Parallel—Oblique—Concave—Convex. On position. Determination of point of attack. Tactical maxims for attack. The attack. Tactical maxims for defense. The defense. Skirmishing. Re-embarkation.

Chapter II.

LANDING OF NAVAL BRIGADE.

THE LANDING.

In all cases of landing the naval brigade the first point to consider and fix should be the base of operations. Whenever it is possible this base should be the squadron, but when operating in shallow water, the largest possible ship or ships whose draught will admit of it should accompany the boats and keep up a constant communication with the forces on shore, so as to be ready at all times to forward with dispatch supplies both of provisions and ammunition, and to forward re-enforcements if required.

The following remarks on the arrangement and landing of a large force will apply, generally, to the management of a smaller number, omitting such points as are applicable only to the larger squadron:

When a landing is to be made from a number of vessels, the arrangement of the flotilla as well as that of the forces on shore should be carefully considered; a station should be assigned in the flotilla line to the boats of each ship, and the men embarked in them should occupy the same relative position in the line of battle on shore.

The artillery boats should be assembled at the extremities of the line, where they can cross their fire in front of the flotilla and also protect the flanks. If the line is very long a few pieces may be placed near the center.

Boats that carry machine guns much superior to the infantry arm in range and power should be placed with or near the artillery. Those having about the same range

as the infantry rifle may be distributed along the line or massed toward the point where the greatest weight of fire will probably be required, either while afloat or after landing.

The main body of the flotilla should usually be preceded by a skirmish line, so spaced as to cover the front which is to be occupied when the landing is made. This line may have some of the light howitzers and machine guns upon its flanks, or the whole or part of the artillery from the main line may advance with it up to a proper range, and thence assist to clear the beach and cover the landing.

When the force to be landed is not large, or when the marines are to act in support or reserve, they will be distributed as sitters in the different boats of their ship, the number to each being governed by the boat's capacity in excess of the crew, and will be assembled on disembarking and be placed on the right of the line or in reserve as the case may be. Each ship's guard will constitute a company. If the force is very large, the landing front much extended, and the marines liable to be engaged from the first, it may be important to land them in a body near their position in the line on shore; and in this case they should be embarked in boats by themselves, being pulled by details of seamen from the companies which are to be held in reserve. In this case they should form the right of the infantry boats, and when the landing is effected the seamen who pulled them should join their proper companies, leaving the boat and keepers on the right. If the marines are to act as skirmishers, they will be embarked in the skirmish boats, and be pulled by a detail of the reserve, who will support them at the landing until relieved from the main body. In the absence of any special orders, however, they will be embarked as first laid down, as it is considered that they can be assembled after landing with sufficient dispatch

to answer all ordinary purposes, and would as a rule be best posted on the main line or in reserve.

In rear of the main line should be stationed, at proper intervals, several fast-pulling boats containing medical officers, with proper outfits and assistants; these boats are designated by a yellow flag and are unarmed. This medical outfit is additional to that in the boat of each ship's senior officer. The crews of these boats when landed will act as stretcher-gangs, &c.

It is important that the station of each ship's group and also of each artillery and Gatling boat should be accurately laid down beforehand by order, for any change after the boats are once in line consumes time and is attended with confusion. All the details possible should be settled before the flotilla is drawn out, for the difficulty of passing orders along a line of boats is very great and adds to delay.

If, however, no special orders have been given as to position, the infantry boats and light machine guns of each vessel will take position as a group on the general line of battle according to the seniority of the captain of the ship to which they belong, counting from the right.

The boats carrying howitzers and powerful machine guns will take station in rear of the proper flanks of their groups, forming a second line three boats' lengths in rear of the first. Thence they can be moved to either flank as may be ordered, without disturbing the infantry line.

The skirmishers belonging to each ship will take position with their boats three lengths in front of the left of their group.

The flotilla will thus be in three lines, the length of which will be regulated by that of the infantry line, and the boats in each line can be moved or arranged without disturbing the order of the others.

When time permits, the boats from the assembled ships should be formed into divisions under proper division

commanders, and be arranged in the line according to the squadron tactics. Where this is done the pair of boats carrying an infantry company should be placed together in the same division, and, of course, the company which they carried should have position in the infantry line of battle corresponding to its place in the flotilla line.

Each division of boats should have a distinguishing flag, and a number should be assigned each boat, which, being painted on canvas, should be hung over each bow and over her stern. It would be well to have these numbers for each division painted in a color peculiar to the division. The division flags should be same as laid down in the signal book for first, second, third, and reserve division.

Should the distance from the point of landing be considerable the boats of each division in tow of each other (lightest boats leading) will fall in, the leading boats of the divisions being abreast, leaving space for the whole line to reform when ordered. If possible, the steam launches should be used for towing in order that the men may be fresh for landing.

On approaching the beach, tow ropes should be cast off and the line reformed.

Covering ships from the squadron should attend the flotilla, and when opposition may reasonably be expected must prepare the way for and cover the landing by their fire. They should take positions on the flanks of the flotilla and thoroughly sweep and search the cover at and about the point where the descent is to be made. As the flotilla advances towards the beach its artillery may also open if necessary, but ammunition must be economized as much as possible for use on shore. Small arms may be used when of service, but as firing from boats with small arms has a tendency to excite the men and throw them into more or less confusion, the practice should only be followed when, for some reason, the ma-

chine guns could not be used, and only then when the enemy were fully exposed and the utmost accuracy of fire assured.

Lookouts at the mast-heads of the covering vessels should give notice by signal of all important movements observed on shore.

If the covering force is weak or distant, the point selected for landing should not be commanded by the adjacent heights, nor should it be embayed between points of land in such a manner as to subject the flotilla to a fire on the flanks. The end of a rather low point is the safest place on which to disembark, as it can be swept on both sides by the fire of the howitzers, and is very defensible from the water in case a retreat becomes necessary.

When the commanding officer perceives the beach to be clear, or when he considers it to be proper, he will order the skirmishers and light howitzers to pull in and land as quickly as possible, ceasing fire from the other boats, if necessary. On landing, the skirmishers will immediately advance, extend and seize the first cover near the beach, if there be any, but will not open fire until ordered by their commander.

When a boat grounds the boat officer and men land immediately. If the boat is large, or there are rocks, so as to render it unsafe for an accoutered man to jump, the gang boards must be used. The men follow the officer to the sheltered spot selected by him for their formation, without waiting for other boats. The officer should consider his men part of a line of skirmishers, the supports of which are behind.

As soon as each boat is clear she must shove off, and, if necessary, return to her ship for a fresh load.

When the skirmishers are landed, the main body will pull in steadily and land, and the companies and battalions form in rear of the covering party. Part of the

howitzers should land with this body, the rest being held back a little until it is apparent that the force is well established, when they also land, and the artillery is placed on the flanks, with its supports at hand. The main body now advance in line or column, according to circumstances, preceded by the skirmishers, who must at all times be backed up steadily by the main force.

As soon as a sufficient number of well-united companies are on shore the irregularly formed skirmishers first landed will be relieved, formed by companies, and sent to their respective battalions.

If landed without opposition, a reconnoissance should at once be made, advance guards, flankers, and rear guards thrown out, and every precaution taken to guard against surprise.

If liable to be attacked, all the ground in the immediate vicinity, especially if broken by a ravine, should be reconnoitered, particularly on the flanks, and, if possible, all the approaches by which the enemy, and especially his cavalry, can advance should be obstructed. All obstacles to a retreat or change of position should be removed, and lookouts, posted in trees or on heights, should give information by signal of all suspicious appearances.

When cover is available, the position and number of the forces should be habitually concealed, drum or bugle signals being sparingly used, bayonets unfixed, and conspicuous objects kept down as much as possible. These precautions are very important on the march, when moving to the attack or in retreat, as they assist to mislead and confuse the enemy.

The force landed should be handled in an open formation, and should move and maneuver with all the celerity compatible with not over-jading the men, who are mostly unused to long marches. When the force is at a halt every opportunity should be given them to rest, and their strength must always be economized as much as possible.

A marked difference should be made between parades for drill and those for field maneuvers. In the former great accuracy should be insisted upon; in the latter the delay and fatigue to the men caused by minutely dressing lines and correcting intervals should be avoided.

Exactitude should never be permitted to impede the execution of a movement where rapidity is essential, nor should too rigid an observance of the regulated battalion intervals be allowed to destroy the elasticity of movement for which those intervals provide. Accuracy of alignment should unhesitatingly be sacrificed where configuration of ground can advantageously be followed in the disposition of troops.

Tactics should be studied rather than drill, accidents of ground rather than precision.

It may be laid down as a general principle that whatever the proportion of the different arms,* the rôle of infantry is most important, and on it will fall the blunt of warfare, whether on the march or on the battle-field.

If its powers of offense have been increased by improvements in its fire-arms, yet the difficulty it has to contend against have also been greatly increased, and it is only by the most careful training in peace and handling in the field that its real powers can be developed. If the action of infantry be sure, it is, however, incomplete by itself; as it advances to the attack, unable to use its own weapon for some distance, it is but a mark for the enemy's guns, and is thus temporarily dependent for its future success on the protection of the artillery.

On the development of the special power of each arm and the harmonious working of the whole must depend success.

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* Ships landing less than 4 companies should land but 1 howitzer or machine gun. Ships landing 4 companies should land 1 howitzer and 1 machine gun, and 1 additional gun should be added for every 2 additional landing companies.

ORDER OF BATTLE.

The position which the hostile lines of battle have with respect to each other during a battle is termed the "order of battle." In successive formations, the line of battle is determined by three staff officers, as follows: at the preparatory command to form the line one officer posts himself at the *point of rest* for the first battalion, facing in the direction the line is to extend; the second posts himself, facing the first, at the *point of rest* for the second battalion; the third posts himself, covering the other two, at the *point of rest* for the third battalion; the first then moves off and posts himself for the fourth battalion. Should there be more than four battalions, the staff officer for the second, as soon as the head of this battalion arrives, hastens to mark the point for the fifth, and so on.

There are four principal orders of battle, viz: *Parallel, oblique, concave, and convex.*

Parallel order of battle.—The two hostile forces are drawn up in a line of battle practically parallel to each other. Both approach each other, or one remains stationary while the other attacks, the attack in either case being simultaneous and of equal vigor throughout the line.

This order of attack is equal in strength and weakness, is the most simple, and most used by those not skilled in the "art of war."

Oblique order of battle.—The general directions of the lines of battle are inclined towards each other at the moment of collision. An attack on one wing and refusing the other will give a case of the "oblique order of battle."

Concave order of battle.—The attack is made simultaneously on both wings and the center refused, so that the attacking force will assume a line of battle which will be concave towards the enemy's line.

Convex order of battle.—The attack is made in the center of the enemy's line, both wings refused, so that the general direction of the line of battle of the attacking force will be convex towards the enemy's line.

Circumstances will decide when either the concave or convex order of battle will be used. All other things being equal, neither would be used in preference to the oblique.

ON POSITION.

(1) One or both flanks should rest on impassable ground.

(2) Free view in front and flanks.

(3) Covered position of the troops.

(4) Favorable ground for retreat; it may be undulating, but the defiles not too near.

DETERMINATION OF POINT OF ATTACK.

For attack a point should be selected whose formation does not render too difficult the movements of the troops. Too much confidence must not be placed in the strength of the ground; it should never induce passive defense.

Inaccessible ground should be avoided, and is, therefore, of no value.

Frederick the Great is quoted as having said:

"Always attack the mountain or highest ground occupied by the enemy, for, if you force that position, all other points will fall into your possession; troops are always more vigorous and orderly in the first stages of an engagement. Do not, therefore, waste time and blood upon points of minor importance and afterwards proceed with disordered and decimated battalions to attack the principal points of the enemy's position, where the greater part of his force will by this time be massed by the course of events, if not by design."

General Dufour says:

"The possession of a large village with stone houses

is always a great advantage on the field of battle, because it may be very easily put in a defensive state and is a kind of fortification. Such a village becomes often a point around which the most severe fighting is seen.

"A wood presents similar advantages. It covers and masks the artillery: it is easily held by skirmishers; cavalry cannot approach it. A wood protects the flank of a line which rests on it, and the position of the latter cannot be held until the former is covered."

THE ATTACK.

Tactical maxims.—(1) Sham maneuvers, surprise: (2) to deceive with few men, and to attack the point of decision with a large force: (3) flank attack with combined forces; (4) long lines to be avoided; (5) reserves ready for action; (6) principal point to drive the enemy from the battle-field; (7) the lead of the battle should not be checked by the plan of operation; (8) to prosecute a great aim; (9) energy and system in the execution.

General principles.—The general disposition of troops in battle will usually be in two lines and a reserve.

When a brigade is formed in two lines, the second line, in all maneuvers, preserves its relative distance from the first and conforms to its movements. The chiefs of the battalions of the second line are charged with the preservation of the proper distances. If the movement is to be executed by only one of the lines, the preparatory command is preceded by the words *first line* or *second line.*

The duties of the *first line* are to keep up a steady continuous fire on the enemy from the moment such fire becomes effective until a final rush is made to carry the position.

The *second line* has for its object (1) to support or prolong the *first line;* (2) to confirm its success; (3) to meet

a flank attack; (4) to protect and cover its retreat, if it is forced to retire.

The *second line* will, therefore, when a position is carried, occupy it at once, and on it will fall the duty of meeting any offensive action of the enemy to retake it.

As soon as the second line is firmly established in the position, the *first line* should be reformed in rear of it.

A portion of it may, however, when there is no *reserve*, be employed in making a flank attack, in which case such portion of it should be moving in echelon on such flank, concealed from view, if possible.

The *reserve* represents a formed body of fresh troops. No body of troops should ever be engaged without a reserve. Its strength must depend on the nature of the position to be attacked and the probable strength of the defending force.

As a general rule the distribution into lines of a brigade should be about one-half for first line, one-third for second line, and one-sixth for reserve.

The distance of the second line from the first and of the reserve from the second must of course depend upon the nature of the ground and other circumstances, but each should be as much under cover as possible and so placed as to afford ready support.

Each battalion of the first line moving to the attack should be divided into three parts: (1) The fighting line; (2) the supports; (3) the main body.

The supports should be placed well under cover and near at hand, and should feed the fighting line as casualties occur.

The following points should be carefully borne in mind:

An attack in front should not be made when a flank movement is practicable; the skirmish line must be strong and well supported; when a charge is to be made, the attacking parties should get as close as possible to the point to be assaulted, and in sufficient numbers before

the final advance is made; attacks must be adequately and closely supported and the men should not be unnecessarily exposed in dense masses to the fire of the enemy; the artillery fire should generally be concentrated upon the position to be attacked and should sweep it up to the last moment.

If, however, the attack is intended as a surprise, the artillery should not concentrate its fire upon this point too early, else the enemy will suspect that an attack is preparing.

Important positions, when carried, should immediately be made secure: in case of repulse, the artillery and machine guns, as well as the supporting infantry, should promptly fire upon and check all purs

The proper choice of position for artillery is of vital importance; the safety of the pieces, and, to a great degree, the efficacy of the fire, depend upon the advantage that is taken of the accidents of the ground. The best position for batteries, so far as the profile of the ground is concerned, is just behind the brow of a gentle eminence, sloping very gradually toward the enemy, and more suddenly to the rear so as to give cover.

If the ground do not fall away in rear, the pieces, whenever practicable, must be sunk by digging the earth away where they are to stand and banking it in front and on the sides; the cut slopes gently downward and to the front.

By taking advantage of any little accident of the ground, such as a low bank or a slight depression, shelter may often be had or labor saved in creating it artificially. The recent improvements in small-arms have made cover more necessary than ever for the protection of batteries.

If the ground slope so abruptly to the rear that the recoil would run the pieces down the slope, a small platform must be cut in the side-hill.

If the position be too high, the battery is often unable

to command ground in its immediate front, besides making itself a target for the enemy's guns; the advantages of a flat trajectory are lost; and the effect of the projectiles is seriously impaired, as they strike with great velocity, and either bury themselves in the ground or ricochet high in the air.

If the position be too low, no view can be had of the field of battle or of the enemy's movements, and an effective fire is impossible.

So far as the nature of the ground itself is concerned, obstructions that splinter freely and rocky places are to be avoided, lest men be struck by splinters or fragments of stone; wooden buildings, hay-stacks, and other combustible objects are even more objectionable; marshy ground, in which it is hard to move the pieces, is also unfavorable

If there be woods or other cover for the enemy's skirmishers within musket-range of the position, it must not be chosen unless the cover be occupied by our own troops; otherwise the battery will be disabled by the loss of its men.

If there be a railway cutting, canal, or sunken road parallel to the front of the battery, the pieces should be put in position close to the edge, as all projectiles falling a little short are caught by the slope in front.

Batteries may be posted with advantage behind a pond, swamp, or stream; a position of this kind is secure from a sudden advance of the enemy as well as unfavorable to his artillery fire.

The artillery should not be moved oftener than necessary, as change of position entails loss of the ranges and interruption of the fire. Unlike the smooth bore, the range and accuracy of the rifle howitzers are such that they do not need to be moved often merely in order to increase the certainty of their fire, though they should not remain a moment in an ineffective position.

Artillery fire is effective in proportion to its concentration. A heavy fire is produced by concentrating a number of guns on a single point.

Howitzers, as well as machine guns, should be carefully guarded against the approach of sharpshooters, and such of the crew as are not working the piece should be extended upon the flanks with their rifles (within easy call of the piece), and watch vigilantly against the enemy's skirmishers. This precaution is especially necessary when the piece is somewhat separated from the main body.

It is not necessary to push the rifled howitzer far to the front, as its effective range with reference to the infantry arm is much greater than was the case with the smoothbores; therefore, as a rule, the gun will not find itself in a position of special danger from the enemy's infantry, though if anything important is to be gained by such exposure the gun, of course, must not be too much considered.

It should be remembered that artillery ought not to be exposed to infantry fire, although on service unavoidable circumstances may occasionally render such exposure for a time necessary.

If a battery be open to the chance of attack from the flanks, scouts should be sent out to reconnoiter and give intelligence of any flank movement of the enemy and to prevent surprise.

It is a waste of ammunition for artillery to fire at a wood simply because it is known or supposed to be held by the enemy; it is ordinarily futile to fire upon a small or detached group of men. In firing at troops, lines or columns are enfiladed, if possible; if not, the center of the formation is aimed at.

The position of the enemy having been discovered and the necessary instructions for an attack given,* the lead-

* General instructions should be issued in writing to each company commander previous to leaving the ship.

ing battalions will extend and advance in fighting formation, preceded, when necessary, by scouts.

The advance of the infantry should always be preceded by a concentrated fire of artillery on the point selected for attack, which fire should be maintained until the last moment possible. To allow of this being carried out, the officer commanding artillery must receive precise information as to the real point of attack.

It will be necessary for a force exposed to artillery fire on open ground to advance in extended order over a greater distance than when the country is broken and affords cover.

When at any point the resistance is such that the advance as ordered cannot be carried out, the re-enforcement by the supports will take place and the battalion main bodies will close up to within 200 yards of the attacking line.

It may be expected that the re-enforcement by the supports would become necessary within about 300 yards of the enemy's position, but this would depend on the amount of resistance offered by the enemy.

If the fighting line of any battalion is still unable to force its way, or receives a counter-attack, the battalion main body will be ordered to re-enforce it, as may seem desirable according to the nature of the ground or urgency of the case.

If there appears but little chance of carrying the position by a *front* attack, it will be desirable, instead of re-enforcing the first line, to use such portion of the second line, and endeavor to outflank the enemy.

When a flank attack with a wider sweep and on a more extended scale than the preceding is designed, a portion of the reserve will be employed to carry it out.

In the event of a flank attack of the enemy taking place, the battalion supporting on that flank will at once wheel up and form for attack; the original attacking

battalion will hold their ground and such portion of the reserve as may be necessary will be at once brought up to support the flank attack, in such manner as circumstances require.

Should any battalions on the other flank be available they may be retired and form in second line.

In case of meeting a flank attack, the available artillery should advance toward the threatened flank and take up a position so as to operate on the enemy's flank, leaving the battalions already engaged free to sustain a continuous fire.

The necessity of *at once* reforming troops after a successful attack cannot be too strongly impressed on officers commanding battalions and companies.

Tactical maxims—defense.—(1) Covered positions for the troops; (2) not to be surprised; (3) the troops should be successively engaged; (4) there should be no inattention; (5) intrenched where no action will be desired; (6) in the engagement the utmost energy is to be exacted; (7) perseverance and energy in execution; (8) great risk for a great object.

THE DEFENSE.

The formations laid down for the attack of a position by a brigade (or larger force) are to a certain extent applicable to its defense. It is, however, impossible to lay down precise instructions for the latter, as so much depends upon the nature and extent of the position to be occupied and the strength of the force available.

The following principles will, however, hold good in most cases:

(1) Reserves being essential to success, the position selected should not be so extensive as to absorb all available men.

(2) A line of outposts should usually be posted in front of the position actually selected, so as to compel the

enemy to develop his real attack in time to allow of the threatened point being reinforced.

(3) In order to secure this, the main position of the troops employed in the defense should, as far as possible, be kept, *in the first instance*, concentrated in a central position.

(4) In defending a position, any favorable opportunities that may offer of assuming the offensive should be taken advantage of, if the force allows of it, for a counter-attack delivered at the right moment will disconcert the arrangement of the attack, and might often change the fortune of the day.

(5) Including all arms and reserves, it may be assumed as a general rule that the force for the defense of a position should be equal to five men for each yard in extent.

SKIRMISHING.

Previous to starting ashore the skirmishers and their supports should be designated and, if possible, the ground they are to occupy pointed out to them.

When skirmishers are thrown out to clear the way for the main body their movements are so regulated as to keep it constantly covered.

Every company of skirmishers has a small reserve, whose duty it is to fill vacant places and to furnish the line with cartridges.

Skirmishers are permitted to carry their pieces in the manner most convenient to them, the muzzle elevated.

The officers and, if necessary, the non-commissioned officers repeat and cause the commands to be executed as soon as they are given; but, to avoid mistakes when signals are employed, they will wait until the last note is sounded before commencing the movement. (For bugle-calls, see Appendix II.)

In the skirmish drill the officers and non-commissioned

officers constantly aim to impress each man with the idea of his individuality and the responsibility that rests upon him. They see that the men economize their strength, preserve their presence of mind, husband their ammunition, and profit by all the advantages which the ground may offer for cover. They likewise cultivate among the men the feeling that they cannot be beaten, and that when compelled to give ground, a new position is to be gained from which the action will be renewed.

Experience soon teaches skirmishers that the ardor with which an enemy pursues a temporary advantage secures his defeat if again boldly and unexpectedly confronted.

It is unnecessary to give figures illustrating the destructiveness of breech-loading fire delivered from behind cover to prove that it would be impossible for infantry in line, two deep, each file occupying 24 inches of front, to march up to any position properly defended, no matter how brave that infantry might be.

It is generally admitted that henceforward manœuvers under fire must be made in open, or, in other words, in skirmishing order. Neither time nor trouble should be spared, therefore, in making men good skirmishers, in teaching them the art of cover, impressing upon them their real strength and how little even the smallest knot of men or the thinnest skirmishing line has now to fear cavalry.

They should be taught the art of advancing by rushes at full running speed for about 50 yards at a time, and by battalions in charging when in a skirmishing, and therefore a loose, line, that has been successively reinforced until there was about a man (not a file) per yard; these charges should be practiced over the roughest ground and through woods, when possible.

The infantry fire of the defensive side begins to tell most seriously when the skirmishers reach within about

600 or 700 yards of the enemy's position. Henceforward the advance must be made by rushes of about 50 or 60 yards at a time from one cover to another, or, if the ground is devoid of cover, the men must throw themselves on their faces at the end of the rush; this should be done by alternate companies. At this phase of the action the serious losses begin, and the officers commanding the supports must use their own discretion in supplying the places of those knocked over in the skirmish line.

While the skirmishers are thus advancing, the main body or reserve of the first line keeps steadily pushing on, as best it can, in line when such is possible, or by independent companies in whatever formation their captains may consider best, where the fire is too heavy for a line.

By the time that the skirmishing line has reached the required distance from the enemy, all the supports will have been merged into it; the main body of the first line ought to be within about 100 yards of the skirmishers; it will then be for the commanding officer to decide whether he will at once make his charge there and then, or wait until he has succeeded in bringing up the main body within a few yards of the skirmishers, taking care not to allow the main body to mingle with them, as it is essential to keep the main line from firing. It is to be hoped that when this phase of the action has been reached the heavy fire of the skirmishing line may have made an impression on the enemy, and as soon as this impression has been effected, every bugle should sound the advance and double, and the officers rushing to the front should carry on with them the main line, the skirmishers joining with it in the charge.

When a line lying down or under cover is engaged in independent firing it is most difficult to stop the firing and get the men to charge unanimously; it is therefore essential that the main body of the first line should not

be allowed to fire previous to the charge. In many cases it may not be perhaps necessary to use this main body, as the skirmishing line, upon being reinforced by the supports, may be impelled forward by its own weight, especially as it is always possible in a long line of attack that the skirmishers may find some chink in the enemy's armor, some weak point, from which he has tendency to recede, and, taking advantage thereof, may carry it with a rush.

RE-EMBARKATION.

An officer, with a suitable assistant in each division, should be detailed to command upon the beach during the absence of the landing force and to arrange matters with reference to re-embarkation. He should have under him such officers, petty officers, and sailors as may be required.

He should erect a signal staff in a convenient position where it will be visible to the flag-ship, and have one or more signalmen to attend it. A bright lookout should be kept for signals, both afloat and ashore, and all ships should keep a lookout for signals made from his station.

If necessary, sheers or other means should be prepared for landing and re-embarking the heaviest weights, such as guns, &c.

As soon as the men are out of the boats the latter must be hauled off to their anchors, with stern lines to the beach, and with a man in each boat to veer in when ordered.

It should be assumed that the force may be obliged to re-embark under pressure from the enemy; therefore, each howitzer and Gatling boat should be prepared to mount its gun in the stern. The division flags should be displayed, and the boats' numbers be hung over the rail toward the beach.

The officer in command should select the most defensible position near and covering the point of embarkation,

and there arrange such breastworks, defenses, and obstructions as can be prepared by the force at his disposal. He should carefully look over the ground and prepare places for machine guns and howitzers, placing any that he may have in position.

When the forces approach the landing, the boats should be dropped in near the beach, the skids, &c., being prepared, as far as proper, for the embarkation of the howitzers. The covering ships should take position.

If it should happen that the enemy is pressing, the breastworks should be manned as the companies come up, and some of the howitzers and machine guns should be placed on the line to keep the enemy at a distance. The main portion of the howitzers and machine guns should be embarked, and the boats should move into such positions that by their cross-fire they can sweep the approaches of the enemy and cover the embarkation of the infantry, which should be proceeded with as expeditiously as possible, being careful to get all howitzers and machine guns afloat while there is still a large number of infantry on shore. The last who are on the beach should retire in skirmishing order, keeping up a vigorous fire to the last moment, when they should lose no time in getting to their boats, the covering vessels, howitzers, machine guns, &c., keeping up a vigorous fire for their protection.

If there is no enemy present, the troops and howitzers can be embarked all at once and return to their ships.

CHAPTER III.

MARCHES.

How made—Passage of Defiles—Passage of Bridges—Surprise and Ambuscade—Transportation of Troops by Rail—Aid to Civil Power—Troops on Board of Transports.

Chapter III.

MARCHES.

The object of the movement and the nature of the ground determine the order of march, the kind of troops in each column, and the number of columns.

The "general," sounded one hour before the time of marching, is the signal to strike tents, to load the wagons, and send them to the place of assembling.

When the troops should form suddenly to meet the enemy, the signal "to arms" is sounded or the "long roll" is beaten. The troops after assembling on their company parades form rapidly in front of their camps.

When necessary, the orders specify the rations the men are to carry in their haversacks. The field officers and captains make frequent inspections during the march; at halts they examine the knapsacks and haversacks, and throw away all articles not authorized.

When it can be avoided, troops should not be assembled on high roads or other places where they interrupt the communication.

The commander-in-chief should send a staff officer to the rendezvous, in advance, to receive the troops, who, on arriving, take their place in the order of battle, and form in close column, unless otherwise ordered. Artillery, or trains halted on the roads, form in file on one side.

The execution of marching orders must not be delayed. If the commander is not at the head of his troops when they are to march the next in rank puts the column in motion.

If possible, each column is preceded by a detachment of pioneers to remove obstacles to the march, aided, when necessary, by infantry. The detachment is divided into two sections; one stops to remove the first obstacle, the other moves on to the next.

In night marches, and at bad places on the line of march, when practicable, and at cross-roads, if necessary, intelligent non-commissioned officers are posted to show the way.

On the march no one shall fire a gun, or cry "halt" or "march" without orders.

Men are not to stop for water unless the commanding officer deems it necessary; the canteens should be filled before starting.

In night marches, the sergeant-major of each battalion should remain at the rear with a trumpeter or a drummer, to give notice when darkness or difficulty stops the march.

Halts to rest and reform the troops are frequent during the day, depending on the object and length of the march. They are made in preference after the passage of defiles.

If two bodies of troops meet on the same road they pass to the right and both continue their march, if the road is wide enough; if it is not, the first in the order of battle takes the road, the other halts.

A body of troops in march must not be cut by another. If two bodies meet at cross-roads, that which arrives last halts if the other is in motion. A body in march passes a body at a halt if it has precedence in the order of battle, or if the halted body is not ready to move at once.

The commanding officer of every body of troops ordered to march will select a competent person, preferably a commissioned officer, to whom will be intrusted the special duty of making the field-notes and sketches, and keeping the journal necessary for the preparation of a map and report of the route traversed. The person so

selected should, if possible, be relieved of a part of his routine duties to enable him to give due attention to this subject.

The commanding officer will daily, or more frequently, if necessary, inspect and verify the notes and journals. If there be no competent subordinate to perform the duty the commanding officer will himself make the notes and keep the journal.

When a detachment leaves the main column the point on the "route" will be noted, and the reason given in the remarks. The commander of the detachment will see that the notes and journals are continued over his new line of march, and after its completion will transmit them to the commanding officer of the main body.

Dispatches, particularly for distant bodies of troops, should be intrusted only to officers to whom their contents can be confided. In a country occupied by the enemy the bearer of dispatches should be accompanied by at least two men; should avoid towns and villages, and the main road; rest as little as possible, and only at out-of the-way places. Where there is danger, he should send one of the men in advance, and be always ready to destroy his dispatches. He should be adroit in answering questions and not be intimidated by threats.

The following is the order of march through an enemy's country, which may be varied according to circumstances (see Plate I):

(1) Advance guard. (One or more pieces of artillery, if deemed necessary, may accompany the advance guard.)
(2) Main body of infantry.
(3) The artillery.
(4) The staff.
(5) Nurses, stretchermen, &c.
(6) Officers' servants and mess-cooks.
(7) The supply train.
(8) The provost guard.
(9) The rear guard.

The average march for infantry is from 15 to 20 miles per day.

When troops move in large bodies, and particularly in the vicinity of the enemy, the march should be conducted in several columns, in order to diminish the depth of the columns and to expedite the deployment into line of battle.

The pioneers precede the column for the purpose of removing obstacles and preparing the way for the troops.

Whenever fences, hedges, walls, ditches, or small streams are encountered, a passageway is made wide enough for four men, or eight men, if in double column of fours, to march abreast without obstruction. This will prevent the column from lengthening out, and also prevent the fatigue and delay of regaining distances.

When practicable, marches should begin in the morning after the men have had their breakfasts.

After marching half or three-quarters of an hour the troops are halted for fifteen minutes to allow the men to relieve themselves, and to adjust their clothing and accouterments.

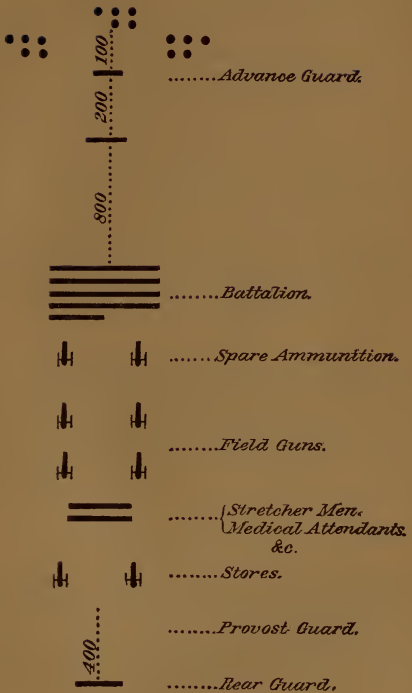
After the first rest there should be a halt of ten minutes every hour. The careful observance of this rule will enable commanders at all times to bring their troops into camp, or on to the field of battle, in good condition and without stragglers.

At the regular halts the rolls are called when necessary and the men are required to fill their canteens.

On long marches a halt of half or three-quarters of an hour should be made for the regular meals. The halt, if practicable, should be made in the vicinity of wood and water.

When long distances have to be overcome rapidly, it is done by changing the gaits; the double time is used for ten or fifteen minutes and the quick time for five minutes; the most favorable ground is selected for the

PLATE I.

Order of March.

double time. Special care should be taken not to exhaust the troops immediately before engaging the enemy.

When necessary, captains may be required to march at the rear of their companies.

No man will be permitted to leave the ranks without permission of the captain. If the absence be for a few minutes only, the man will leave his arms and accouterments with the company till he rejoins it; if he needs medical attendance the captain gives him a pass to the surgeon bearing his name, company, and battalion; if he is unable to return to the company the surgeon indorses the pass, stating that he is permitted to fall out on account of sickness.

The provost guard of the brigade marches in rear of the brigade. It should be composed of a detachment of marines.

It is the duty of all officers and non-commissioned officers to suppress straggling. Men who fall out of ranks are examined by the provost guard, and if absent without authority they are arrested and sent to their battalions.

Whenever delays occur in front it is the duty of all commanders to investigate personally, or by means of staff officers, every cause of delay, and staff officers should be frequently sent ahead for the purpose of gaining any information that may shorten the march and lessen the fatigue of the troops.

PASSAGE OF DEFILES.

In all passages of defiles, artillery, if possible, is so posted as to bring a converging fire on the enemy's approach, thereby enabling the infantry to form or withdraw under its cover. In supporting artillery, infantry is posted on the flanks of the battalion and never in their rear.

In passing a defile to the front, the advance of the troops is covered by skirmishers supported by strong reserves. The battalions, in column of fours, pass the defile in the order designated by the brigade commander. On emerging from the defile, the battalions form line under the immediate direction of the brigade commander, the flank battalions being so posted as to prevent the enemy from passing between them and the entrance to the defile.

To pass a defile in rear, the line is formed facing the enemy; the battalions, under the protection of a strong skirmish line, supported by reserves, are then withdrawn in the order designated by the brigade commander; the movement begins with the battalion farthest from the entrance to the defile, each battalion moving by the flank nearest the defile. On emerging from the defile the line is formed on ground previously indicated by the brigade commander and the skirmishers are withdrawn in the same order as the battalions.

PASSAGE OF BRIDGES.

If a battalion desires to cross a bridge held by an enemy the skirmish line will approach the margin of the river, and if the flanks cannot be gained will lie down, cover themselves, and keep up a brisk fire on the enemy. The supports (strengthened, if necessary) will advance, and, supported by the main body, charge and force the passage with the bayonet; this point gained and the main body having crossed the bridge, the supports will gradually extend from their center, the main body maintaining possession of the bridge, and the old skirmish line keeping up their fire until covered in succession by the new line. When the new line has completed its extension the main body will send out fresh supports, and the old skirmish line will assemble in rear of the main body. The whole will then move forward according to the original forma-

PLATE II.

A BATTALION IN EXTENDED ORDER ADVANCING ACROSS A BRIDGE IN CONTACT WITH AN ENEMY.

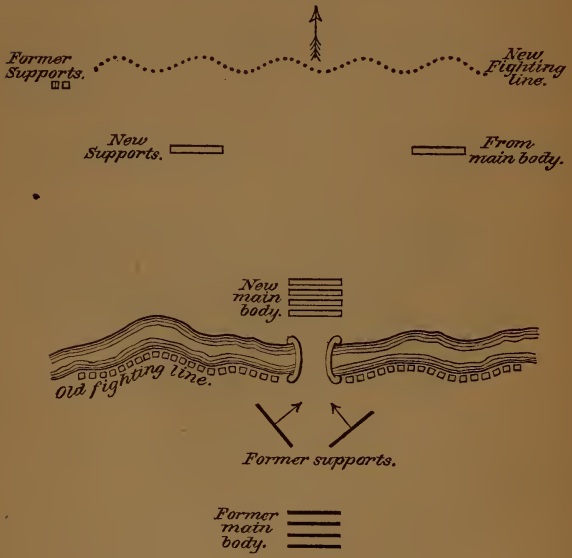
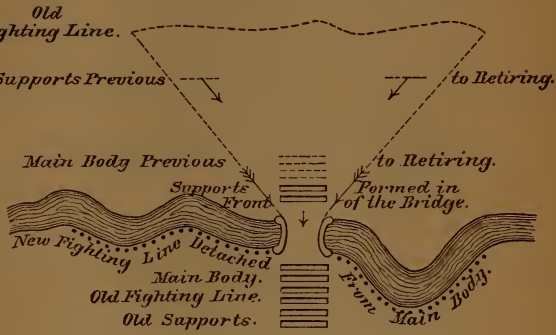


PLATE III.

A BATTALION IN EXTENDED ORDER RETIRING ACROSS A BRIDGE IN CONTACT WITH AN ENEMY.



tion. If necessary, the artillery or a portion of it should take favorable positions and engage that of the enemy. It should be assembled in rear of the main body before the withdrawal of the old skirmish line. (See Plate II.)

In retiring, the main body will first pass and take post at the bridge-head, immediately detaching parties to both flanks to line the river in extended order. The supports will approach and halt in front of the bridge until the skirmish line is withdrawn; in order that this may be effected without unnecessary delay the skirmish line should incline towards the bridge; when at some distance from it, and on arriving near it, they should run briskly over it and form in rear of the main body. The supports will then cross, and in like manner join the main body, when the whole will be prepared to defend the bridge or to retire as may be ordered. (See Plate III.)

The new skirmish line will commence firing as soon as its front is clear; and if the retreat is to be continued supports will be again thrown out between them and the main body.

SURPRISE.

Escalade and surprise of a fortified place.—A place is taken by surprise whenever a sufficient number of men are secretly introduced into it to cause the defenders to abandon or surrender it. It is taken by escalade, when ladders are used to cross the walls.

The surest way of succeeding in a surprise is to have a perfect knowledge of the interior of the place, or to be accompanied by reliable guides, who know those parts of the place which may be penetrated with least difficulty. Such parts are ordinarily dilapidated portions of the body of the place, houses contiguous to the walls, the windows of which are not barred, &c. Aqueducts and sewers have also sometimes been used for the introduction of armed men, unknown to the garrison, but when a

place is badly guarded, all parts are accessible with ladders, and it is sometimes best to choose the highest walls for the escalade, as the enemy will probably, from a feeling of security, be less vigilant at such parts of the body of the place.

At the moment of the escalade, the ladders should be filled with men, and it is necessary, therefore, that they should be underpropped about the middle. Precipitous rocks may be escaladed by grasping bushes and roots, or by planting the bayonet in the crevices of the rock in order to reach the top. Such escalades are very dangerous when an enemy defends the height, as heavy stones may be rolled down upon the assailants.

The most favorable time for a surprise is at night, when there is no moon. A long march may then be made without discovery, and the troops may arrive an hour before day. This is the propitious moment for the execution of the design. It is then that men sleep most profoundly, and it is at that hour the attacking force may begin in the dark and end the work by daylight; such favorable circumstances are much increased by heavy wind and rain during the night, as the clanking of arms and other inevitable noises made by the troops cannot be heard by the garrison, and the latter, besides, are more disposed to negligence. It is extremely important for the men to be able to recognize each other in the darkness, and the simplest means of doing so is to put the shirt outside the dress or to tie a white band around the arm.

If the attacking force is large and is to approach from the water it is well to quietly land a portion of the force some distance from the point of attack and march it by a route previously designated to the enemy's rear, so timing the movement as to arrive not more than an hour before dawn. A preconcerted signal should then be made to the main body, whereupon the latter should advance

and attack the front. As soon as the signal from the main force is made indicating that they are in position, a simultaneous movement should be made by both attacking parties. A knowledge of the country and of the position of the enemy's outposts would of course be essential to success. Steam launches should not be used, oars should be muffled, lights extinguished, and the utmost quiet observed. Ordinarily, in such cases, no accurate formation should be attempted by the landing force, other than the forming and joining of the various platoons, but the duties of each boat officer should be accurately laid down beforehand. A strong reserve force should be left to guard the boats and assist the attacking party, if repulsed. Both parties should be furnished with axes, planks, ladders, and other necessary implements to force the gates or doors, scale walls, and cross ditches.

When the first division has penetrated the place by escalade or otherwise, it surrounds at once some of the adjacent quarters, while detachments open the gates to the troops outside after having taken or killed the guards. As soon as the gates are opened and sufficient numbers are at hand, they spread themselves through the city or fort, leaving good reserves upon which to retreat in case of check.

AMBUSCADES.

In planning an ambuscade it is necessary to be well acquainted with the enemy's force and the state of discipline shown by it. The position chosen for the attempt must be favorable to the concealment of troops, and, if practicable, it should be reached by night, every precaution being taken to insure secrecy. The best positions are those where the enemy is inclosed in a defile or village, and has not taken the proper precaution to secure himself from an attack.

Ambuscades may frequently be attempted with success in the affairs of advance and rear guards by push-

ing the enemy vigorously and then falling back if he offers a strong resistance, so as to draw him upon a point where troops are posted in front to receive him.

To trace anything more than a mere outline as a guide in operations of this kind, which depends upon so many fortuitous circumstances, would serve but little useful purpose. An active, intelligent officer, with an imagination fertile in the expedients of his profession, will seldom be at a loss as to his best course when the occasion offers; to one without these qualities opportunities present themselves in vain.

TRANSPORTATION OF TROOPS BY RAIL.

The average passenger-car will seat sixty men, but a small one only fifty. "Flat" cars for the transportation of the artillery are usually 28 feet long and 8 feet wide. By careful loading they will carry two howitzers and limbers and two caissons and limbers.

Previous to entering the cars infantry should be ordered to take off their knapsacks and to shift their haversacks, bayonets, and canteens round to the front of their bodies. This done, they will receive the order to get into the cars, each man taking with him his arms, knapsacks, &c.

Each man will retain possession of his rifle, unless his commanding officer should allow the arms to be placed upon the knapsacks under the seats; arms are *never* to be laid upon the floor of the car.

The strictest silence should be maintained in the ranks from the moment of entering the station until the train has departed.

The smallest possible number of men should be permitted to fall out whilst in the station. In order to prevent the necessity for their doing so, it is advisable to have a brief halt somewhere near the station.

Once in the cars, the men should be kept there, only those required for fatigue being allowed on the platform.

Journey.—In arranging the time table, it is essential to establish a low average speed, so that lost time may be made up, increasing it for a short distance occasionally.

Before starting, sentinels will be posted at each end of each car to keep the men from passing from one car to another or from standing upon the platforms, also to prevent unauthorized persons from entering the car. The arrangements for feeding the men should be ample. Hot coffee and tea are especially necessary for the comfort of the men. During all journeys, each car will be under the special supervision of an officer assigned to it, and all company officers are to be with their companies during halts.

If, through carelessness, any one is not in the train when the time arrives for it to leave, the train must not wait for absentees.

The police duties at the halting places should be strictly carried out. No intoxicating liquor should be allowed in or near the train.

Whenever there is cause for apprehending that the track or roadway will be interfered with, an extra engine, carrying a staff officer, should be kept running ahead, to be always in signaling distance.

Disembarkation.—With infantry, the main body should be marched clear of the station, and halted on the nearest available open space on the route to be taken, to await the arrival of the baggage, a fatigue party being left to assist with baggage.

As soon as the baggage comes up, the column will march to its destination, no halt being again permitted until clear of the terminus.

When the train reaches its destination the officers will get out first; the "assembly" being sounded, the men will get out and fall in opposite the cars.

If the place ordered for disembarkation be obstructed or threatened by a crowd or mob, the officer in charge of the train will, if possible, select a clear spot, not too far removed, and after establishing a guard will disembark his men at that point.

AID TO CIVIL POWER.

Every officer who may be required to move through a city or town, under orders to preserve the peace, should provide himself, if possible, with an accurate map of the place, or a reliable guide, or both, unless he is personally well acquainted with the locality.

The tactical formation to be assumed by troops on the march through cities and towns where a disturbance of the peace is threatened or a mob is to be dispersed, cannot, from the infinite variety of possible situations, be definitely laid down. Such movements must be left to the judgment of the commanding officers. As a rule, however, although abolished in the tactics, the formation in a hollow square will probably be found best adapted for the purpose, in which case the square should be formed with its front and rear extending entirely across the street, from building to building (not from curb to curb), so that each sidewalk may be occupied by the columns of fours forming the sides, the square thus occupying the street to the exclusion of every other person; and all persons wishing to pass in an opposite direction must be compelled to seek another route or to wait in side streets until the square has passed.

The manner of forming the square is left to the judgment of the officer commanding. He designates the strength of each front, and the officer who is to have charge of each. The color-guard should march within the square, also a reserve. The front and rear of the square should have small reserves at the corners to increase the width when the streets demanded.

When the square halts its rear faces about by com-

mand of the officer placed in charge, and the column of fours at the sides, if opposite to side streets, wheel into line, facing outward, each by command of its own chief, as it may be necessary. File closers march on the inside flanks, and the field, staff, and non-commissioned staff, musicians, and ambulances are within the square in such positions as may be assigned by the commanding officer.

A double column of fours will be found well adapted as a preparatory movement to the formation of a square.

As a rule music must not be played; the march should be conducted as silently as possible.

A squad of police should accompany each column of troops to make the arrests. In this manner an ordinary mob can be cowed and broken up without firing a shot.

Under no circumstances should any part of a crowd be permitted to remain on the side-walk, to threaten the flank of troops. Firing with blank cartridges should never be permitted; severe measures are the only humane ones.

If it is necessary to force an entrance, a strong door, even if barred and bolted, can be blown up with a few pounds of powder. A rifle bullet fired into a lock will generally destroy it.

Commanding officers will be very circumspect regarding the embarkation or disembarkation of troops, and march their troops to any distance required to have these operations conducted in places unobstructed.

Troops in trains of cars or carriages must never be disembarked or embarked in the presence of a hostile crowd, nor in the presence of any crowd, if such can be possibly avoided; neither will trains containing troops be stopped at any way stations in such positions that an assault cannot be promptly checked. It is a safe rule to stop trains in such cases at such a distance from stations or thickly populated districts that open country on either side of the track may be availed of to post guards around the train, if necessary, during the halt.

TRANSPORTATION OF TROOPS BY SEA.

Immediately after embarking the men will be assigned to quarters, equal parties on each side of the ship, and no man will be allowed to loiter or sleep on the opposite side. As far as practicable the men of each company will be assigned to the same part of the vessel, and the squads, in the same manner, to contiguous berths.

No officer is to sleep out of his ship or quit his ship without the sanction of the officer commanding on board.

Immediately after embarkation, a guard is to be appointed to furnish sentinels and orderlies. The strength of the guard will vary with the number of men embarked, but where a large number are embarked the following are necessary, viz, one sentinel each side of the forecastle, one on the quarter-deck, one at each gangway, one over baggage-room, one over scuttle-butt.

At sea, the guard will mount with side-arms only; in harbor those upon deck should mount with their arms.

The sentinel at the baggage-room should never allow it to be opened, unless in the presence of a commissioned officer or one of the ship's officers; if it be at any time necessary to store baggage elsewhere than in the baggage-room a sentry should always be placed over it.

The officer of the guard will be officer of the day. He is to command the guard, and will be held responsible that the sentries are posted and instructed in their duties as soon as practicable. He will be held generally responsible that the routine appointed for the force embarked is carried out, and will be referred to, when necessary, in all matters not requiring the intervention of the commanding officer, giving every assistance in his power to the officers of the ship.

Sentinels will be kept over the fires, with buckets of water at hand, promptly to extinguish fires. Smoking is prohibited between decks or in the cabins at all times.

Lights shall not be allowed between decks, except such ship lanterns as the master of the vessel may direct, or those carried by the officer of the day in the execution of his duty.

The commanding officer will make arrangements, in concert with the master of the vessel, for calling the troops to quarters, so that in case of fire-alarm or the approach of the enemy every man may repair promptly to his station.

All the troops will turn out at a prescribed hour a. m. without arms or uniform, and (in warm weather) without shoes or stockings, when every individual will be clean, his hands, face, and feet washed, and his hair combed. The same personal inspection will be repeated thirty minutes before sunset. The cooks alone may be exempted from one of these inspections per day, if necessary.

Officers will enforce cleanliness as indispensible to health. When the weather will permit, bedding will be brought on deck every morning for airing.

The men will not be allowed to sleep on deck in hot weather or in the sun; they will be encouraged and required to take exercise on deck in squads by succession, when necessary.

At morning and evening parade the surgeon will examine the men, to observe whether there be any appearance of disease.

In loading vessels with stores for a military expedition, the cargo of each should be composed of an assortment of such stores as may be available for service in case of the non-arrival of others; and they should be placed on board in such a manner that they may be easily reached in the order in which they are required for service.

A list should be made of the stores on board each vessel and of the place where they are to be found in it; a copy of this list to be sent to the chief officer of the proper department in the expedition or at the place of destination.

CHAPTER IV.

GUARDS AND SENTINELS.

Advance Guards—Rear Guards—Flank Guards—Patrols—Offensive Patrols—Defensive Patrols—Provost Guard—Police Guards—Special Orders for Sentinels of Police Guards—Safe Guards—Picket—Outposts—Guards—Attack of Grand Guard.

Chapter IV.

GUARDS AND SENTINELS.

ADVANCE GUARDS.

Advance guards are formed in front of a column for the purpose of covering and concealing the movements of the main body, feeling the way through a country, gaining intelligence of the enemy, and giving timely notice of his approach to the main body.

The strength of advance guards is dependent on the distance they are required to operate from the main body, the nature of the country, force of the enemy, &c.

When a column is marching along a road the advance guard will be composed of one or more companies, divided as follows:

A company forming the advance guard of a column marching along a road is divided into two parts. One half the company will form a support under the command of the captain, about 300 yards from the column; the other half company, under its guide, will move about 200 yards in front of it, and will detach two men 100 yards to its front, two men 100 yards to its right front, and two men 100 yards to its left front. These three parties should each be placed in charge of a non-commissioned or petty officer.

The support should send on a connecting file (two men) about 100 yards and drop a file a similar distance in its rear.

The same rule applies with several companies as with one, the strength of the detached parties being dependent upon the strength of the companies employed.

The leading company of the column should also send out a connecting file to the front.

The pioneer corps and a portion of the signal corps should accompany the advance guard; a portion of the latter to have axes and intrenching tools if deemed necessary.

An advance guard crossing a piece of open country should deploy as skirmishers, resuming their original formation as soon as passed. They should turn the flank of every object capable of affording concealment to an enemy, carefully examing all ravines, woods, defiles &c.

In case of attack the main body should at once be informed and every means taken to hold the enemy in check. If he appears in force, and is too strong for the advance guard, the latter should fall back slowly on the main body.

REAR GUARDS.

A rear guard is an advance guard reversed. It is formed in the same way as an advance guard, but turned to the rear.

The last company of the column should drop a connecting file to the rear.

The general intention of rear guards is to protect the flanks and prevent the enemy from attacking in the rear. It should march closer to the main body than the advance guard.

In the case of retreat the rear guard destroys all bridges, and places obstructions in the way to check the pursuit of the enemy.

The strength of rear guards when advancing toward the enemy is usually about one-twentieth of the whole force; on the *retreat* from one-third to one-eighth of the force.

FLANK GUARDS.

During flank marches, flank detachments are sent out toward the enemy; they march parallel to the main col-

umn, watch the enemy, and if necessary oppose him long enough to enable the main body to form in order of battle. Their duties correspond to those of advance guards in offensive marches and rear guards in retreat.

Flank marches should always be undertaken and executed with many precautions, for when making them it is easy to lose our own communications and line of retreat, if we have not time to gain the new line of operations. The strength of flank guards is in proportion to the duties it has to perform.

The arrangement for the march and the manner of operation of the flank guard depend entirely upon the position of the enemy, the nature of the country, and the direction of the roads.

In addition to the main flank guard sent out in the direction of the enemy, each column of the main body detaches small advance, flank, and rear guards.

PATROLS.

A patrol is a detachment employed to obtain information respecting the enemy's movements and position and the nature of the country over which the force has to move; also, to keep open the communications between the different portions of a command. (See Plate IV.)

Defensive patrols do not contain more than eight men, and frequently only three. Their duty is not to fight, but to obtain information of the enemy and of the country in front of the line of march. They should take advantage of all hedges, thickets, woods, and undulations of the ground along the roads to conceal themselves from sight and to see everything without being seen. They should explore all ravines, woods, ditches, hedges, walls, fields of grain, &c. In visiting houses where an enemy might be concealed, only one of the men should enter, the others remaining outside to give the alarm if necessary.

When a body of the enemy is discovered, the patrol should conceal itself while one of the number goes back and informs the commanding officer of the detachment to which they belong.

Patrols of this kind precede the advance guard.

Offensive patrols contain a greater number of men than the last. They should be strong enough to effect the purpose for which they are sent, *i. e., to obtain information and not to fight.*

They march with advance and rear guards and use flankers.

Patrols, as a rule, should return by a different road from that they used in going out. They should never halt where they can be seen, but always in some concealed place, guarded by sentries.

The officer in command of a defensive patrol has a very important duty to discharge. He must make diligent inquiries as to the enemy, when and where seen, what kind of troops, what roads, &c. He should remember in making his report that *incomplete reports are worse than none,* since they mislead and entail faulty dispositions of troops.

A portion of the patrols should be mounted if practicable.

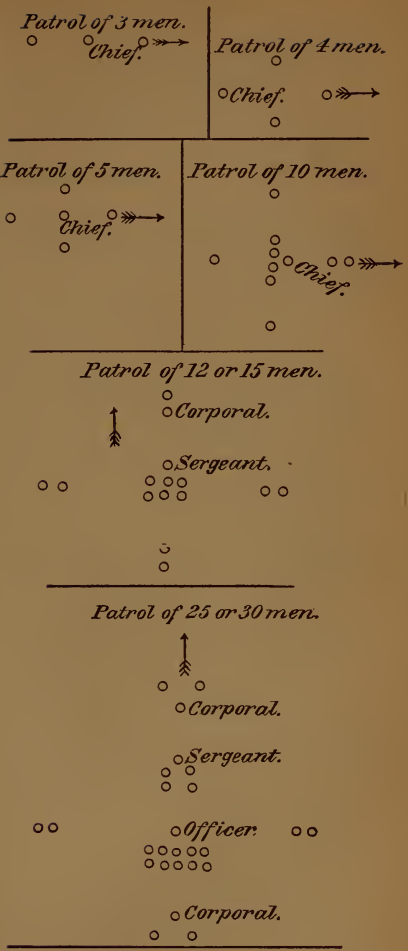
PROVOST GUARD.

A provost guard is formed by the commander-in-chief where one is deemed necessary.

It is commanded by a provost-marshal, under whose orders the guard acts.

Its duties are, under the direction of the commander-in-chief, to suppress marauding expeditions, prevent disturbances, keep order, regulate places of public resort, to enforce orders with regard to conduct of a camp or town, and to make searches, seizures, and arrests.

The provost-marshal takes charge of all prisoners, ar-


Patrol of 3 men.
Chief.
Patrol of 4 men.
Chief.
Patrol of 5 men.
Chief.
Patrol of 10 men.
Chief.
Patrol of 12 or 15 men.
Corporal.
Sergeant.
Patrol of 25 or 30 men.
Corporal.
Sergeant.
Officer.
Corporal.

rests stragglers and offenders of the command; may examine passes of officers, soldiers, and citizens.

He is assisted by the brigade provost-sergeant, who receives his instructions from him.

POLICE GUARDS.

Each battalion in camp should detail daily a police or camp guard of such strength as the commanding officer may deem necessary. It should be commanded by a lieutenant, under the supervision of a captain, as battalion officer of the day.

Ordinarily it would furnish the following sentinels: One over the arms of the guard, one on the color line over the colors (if there are any), one at the commanding officer's tent, one or more in rear of the officers tents, and one on each flank between it and the next battalion. If it is a flank battalion one more should be posted on the outer flank.

An advanced post is detached from the police guard, composed of a sergeant, a corporal, a drummer, and nine men to furnish sentinels and the guard over the prisoners.

The men are the first on the guard roster from each company. The men of the advanced post must not leave it under any pretext. Their meals are sent to the post.

The advanced post furnishes three sentinels, two a few paces in front of the post, opposite the right and left wing of the battalion, posted so as to see as far as possible to the front, and one over the arms.

SPECIAL ORDERS FOR SENTINELS OF THE CAMP GUARD.

Sentinels over the colors and stacks.—(1) Allow no one to touch the colors except the color bearer, or the sergeant of the camp guard when accompanied by an escort of two armed men. (2) Permit no one to take arms from

the stacks on the color line except by order of some officer or non-commissioned officer of the guard.

Sentinels at the commanding officer's tent.—Notify the *commanding officer*, day or night, of any unusual movement in or about camp.

Sentinels on the front, flank, and rear of camp.—Allow no sailor or marine to leave camp with arms unless passed by a non-commissioned officer.

SAFEGUARDS.

Safeguards are protections granted to persons or property in foreign parts by the commander-in-chief, or by other commanders, within the limits of their command.

Safeguards are usually given to protect hospitals, public establishments, establishments of religion, charity, or instruction, museums, depositories of the arts, mills, post-offices, and other institutions of public benefit.

A safeguard may consist of one or more men of fidelity and firmness, generally non-effective, non-commissioned officers, furnished with a paper setting out clearly the protection and exemptions it is intended to secure, signed by the commander giving it, and his staff officer; or it may consist of such paper delivered to the party whose person, family, house, and property it is designed to protect. These safeguards must be numbered and registered.

The men left as safeguards by one corps may be replaced by another. They are withdrawn when the country is evacuated; but if not, they have orders to await the arrival of the enemy's troops, and apply to the commander for a safe conduct to the outposts.

THE PICKET.

To avoid fatiguing the troops by keeping them constantly ready for a movement and combat, but at the same time to secure them against attack and be able to afford

prompt assistance at outposts, and to furnish detachments and guards unexpectedly called for in the twenty-four hours, a portion of the main body is detailed as a picket.

The detail for the picket is made daily, after the details for duty of the first class, and form the next for detail on the roster of that class. It is designed to furnish detachments and guards unexpectedly called for in the twenty-four hours; it counts as a tour of the first class to those who have marched on detachment or guard, or who have passed the night in bivouac.

Detachments and guards from the picket are taken from the head of the picket roll in each company, and, if possible, equally from each company.

The strength of a picket varies, but approximately is from one-fifth to one-sixth the entire force.

The picket is assembled by the adjutant at guard mounting; it is posted twelve paces in rear of the guard, and is inspected by its own commander. When the guard has marched in review, the commandant of the picket marches it to the left of the police guard, where it stacks its arms, and is dismissed; the arms are under charge of the sentinel of the police guard.

The picket is only assembled by the orders of the commanding officer or officer of the day. It forms on the left of the police guard.

The officer of the day requires the roll of the picket to be called frequently during the day; the call is sounded from the police guard. At roll-calls and inspections, infantry pickets assemble with knapsacks on. The picket is assembled at retreat; the officer has the roll called and inspects the arms.

The officers, non-commissioned officers, and soldiers of the pickets are at all times dressed and equipped.

The picket does not assemble at night, except in cases of alarm, or when the whole or a part is to march; then the officer of the day calls the officers, who call the non-

commissioned officers, and the latter call the men; for this purpose each ascertains the tents of those he is to call. They are assembled without beat of drum or other noise.

OUTPOSTS OR GRAND GUARDS.

The term "outposts" is used at the present time to designate the particular detachments of troops and the method of arranging them by means of which a force, when in bivouac, in camp, or in cantonment is protected from surprise by an enemy.

Outposts, therefore, perform for the brigade at rest a service similar to that performed by the advance and rear guards, and by flanking patrols when the enemy is marching.

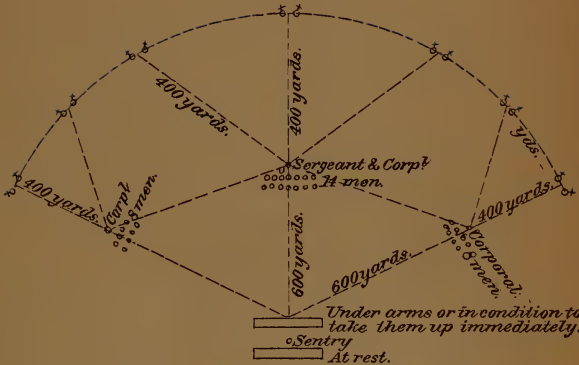
The object of a system of outposts is twofold: (1) To watch the enemy, so as to be able to give notice of his approach: (2) to stop him, in order to give the brigade sufficient time to take up a position for defense.

The strength of grand guards depends upon the strength of the force, nature of the country, and the strength and position of the enemy. The proportion recommended is from one-third to one-sixth of the entire command.

It is usually divided into three parts: (1) A line of sentinels. (2) An inner line of small posts, which are the immediate supports of the sentinels. (3) The main guard, placed as supports in rear of the small posts; small posts are placed from 300 to 600 yards in rear of line of sentinels; main body should be from 400 to 800 yards in rear of small posts. (See Plate V.)

The details for outpost duty are made in the usual way, from each battalion, and are assembled at guard-mounting in rear of the camp guard and inspected by their commander, who is usually a captain. It is under the special direction of the field officer of the day of the brigade.

PLATE V.



Arrangement of a Grand Guard.

Grand guards usually mount at the same time as the other guards, but may mount before daybreak if the brigade commander thinks it necessary to double the outposts at that time.

Officers on outpost duty should, when practicable, have a good map of the country, a field-glass, and writing materials.

A sketch of the ground occupied by outposts is usually made by a staff officer. It is important that the commander-in-chief should be furnished with one. Accurate written reports should be sent to him and to the field officer of the day, when deemed necessary.

It is usually recommended that the commander, upon reaching the point selected as the post for the grand guard, and after posting a sentry in front of his guard, should proceed to reconnoiter the ground in his front previous to establishing the line.

The following are standing instructions to grand guards, in addition to any special ones that may be given:

To inform the nearest posts and the field officer of the day, or the brigade commander, of the movements of the enemy, and of the attacks they receive or apprehend; to examine every person passing near the posts, particularly those coming from without; to arrest suspicious persons, and all soldiers and camp followers who try to pass out without permission; to send to the brigade commander, unless otherwise directed, all country people who come in.

If a body of troops attempt to enter the camp at night, unless their arrival has been announced, or the commander is known to, or is the bearer of a written order to, the commander of the grand guard, he stops them, and sends the commander under escort to the field officer of the day, and warns the posts near him.

Bearers of flags are not permitted to pass the outer chain of sentinels; their faces are turned from the post or brigade; if necessary, their eyes are bandaged; a non-

commissioned officer stays with them to prevent indiscretion of the sentinels.

The commandant of the grand guard receipts for dispatches from the enemy, and sends them to the field officer of the day or brigade commander, and dismisses the bearer; but if he has discovered what ought to be concealed from the enemy, he is detained as long as necessary.

Deserters are disarmed at the advanced posts, and sent to the commander of the grand guard, who gets from them all the information he can. If many come at night they are received cautiously, a few at a time. They are sent in the morning to the field officer of the day, or to the nearest post or camp, to be conducted to the brigade commander. All suspected persons are searched by the commanders of the posts.

After a grand guard is posted the first care of the commander and of the field officer of the day is to get news of the enemy; then to reconnoiter his position, and the roads, bridges, fords, and defiles. This reconnaissance determines the force and the position of the small posts and their sentinels, day and night. These posts, according to their importance, are commanded by officers or non-commissioned officers.

In detached corps, small posts of picked men are at night sent forward on the roads by which the enemy may attack or turn the position. They watch the forks of the roads, keep silence, conceal themselves, light no fires, and often change place. They announce the approach of the enemy by signals agreed upon, and retreat, by routes examined during the day, to places selected, and rejoin the guard at daybreak.

The commanders of grand guards visit the sentinels often; change their positions when necessary; make them repeat their orders; teach them under what circumstances and at what signals to retire, and particularly

not to fall back directly on their guard if pursued, but to lead the enemy in a circuit.

The fires of grand guards should be hidden by some sort of screen. To deceive the enemy, fires are sometimes made on ground not occupied. Fires are not permitted at small posts liable to surprise.

Advanced posts will not take arms for inspection or ceremony when it would expose them to the view of the enemy.

The sentinels are placed on points from which they can see farthest, taking care not to break their connection with each other or with their posts. They are concealed from the enemy as much as possible by walls or trees or elevated ground. It is generally even of more advantage not to be seen than to see far. They should not be placed near covers, where the enemy may capture them.

If the post of a sentinel must be where he cannot communicate with the guards a corporal and three men are detached for it, or the sentinels are doubled, that one may communicate with the guard. During the day the communication may be made by signals, such as raising a cap or handkerchief. At night sentinels are placed on the low ground, the better to see objects against the sky. A sentinel should always be ready to fire; he must be sure of the presence of the enemy before he fires, but once satisfied of that he must fire, though all defense on his part be useless, as the safety of the post may depend on the alarm thus given. Sentinels fire on all persons deserting to the enemy.

It is of the utmost importance that sentinels should be wide awake and allow nothing to escape their observation, as the safety of the whole camp is involved. During a dark night a man can see better himself, and is less exposed to the view of others, when in a sitting posture than when standing up or moving about. This practice is recommended for sentinels of outposts.

Sentinels of the grand guards should *not pass the call* unless specially ordered so to do.

At night half the men of the grand guard off post watch under arms, while the rest lie down, arms by their side.

All out guards stand to arms at night on the approach of patrols, rounds, or other parties; the sentinel over the arms has orders to call them out.

To lessen the duties of rounds and keep more men on the alert at night, sentinels are relieved every hour. To prevent sentinels from being surprised, it is sometimes well to precede the countersign by concerted signals, such as striking the rifle with the hand, striking the hands together, &c.

With raw troops, or when the light troops of the enemy are numerous or active, and when the country is broken or wooded, the nights stormy or dark, sentinels should be doubled. In this case, while one watches, the other, called a flying sentinel, moves about examining the paths and hollows.

On the approach of any one at night the sentinel orders "Halt!" If the order is not obeyed after once repeated, he fires. If obeyed, he calls "Who goes there?" If answered "rounds" or "patrol," he says "Halt! advance one, with the countersign." If more than one advance at the same time, or the person who advances fails to give the countersign or signal agreed on, the sentinel fires, and falls back on his guard. The sentinel over the arms, as soon as his hail is answered, turns out the guard, and the corporal goes to reconnoiter. When it is desirable to hide the position of the sentinel from the enemy, the hail is replaced by signals; the sentinel gives the signal, and those approaching the counter-signal.

The commander of a grand guard regulates the numbers, the hours, and the march of patrols and rounds, according to the strength of his force and the necessity for

precaution; and, accompanied by those who are to command the patrols and rounds during the night, he reconnoiters all the routes they are to follow.

Patrols and rounds march slowly, in silence, and with great precaution, and halt frequently to listen and examine the ground. The rounds consist of an officer or non-commissioned officer and two or three men.

When patrols are sent beyond the advance post, the posts and sentinels should be warned.

On their return, commanders of patrols report in regard to the ground and everything they have observed of the movements of the enemy, or of his posts, and the commandant of the grand guard reports to the field officer of the day.

It rarely occurs that artillery is placed at the outposts. Whenever it happens that a piece or two may be deemed necessary, to sweep some passage or defile in advance of the line of outposts, the guns must be protected by a strong post, to insure their safety in a retreat.

GUARDS.

Camp and garrison guards will be relieved every twenty-four hours. The guards at outposts will ordinarily be relieved in the same manner, but this must depend on their distances from camp or other circumstances which may sometimes require their continuing on duty several days. In such cases, they must be previously warned to provide themselves accordingly.

All persons, of whatever rank in the service, are required to observe respect toward sentinels.

The countersign, or watchword, is given to such persons as are entitled to pass during the night, and to officers, non-commissioned officers, and sentinels of the guard.

The parole and countersign are issued daily from the principal headquarters of the command. The counter-

sign is given to the sentinels and non-commissioned officers of guards; the parole to the commissioned officers of guards.

When the parole and countersign cannot be communicated daily to a post or detachment which ought to use the same as the main body, a series of words may be sent for some days in advance.

If the countersign is lost, or one of the guard deserts with it, the commander on the spot will substitute another, and report the case at once to the proper superior, that immediate notice may be given to headquarters.

SENTINELS.

Sentinels will not take orders, or allow themselves to be relieved, except by an officer or non-commissioned officer of their guard or party, the officer of the day, or the commanding officer; in which case the orders will be immediately notified to the commander of the guard by the officer giving them. Sentinels will report every breach of orders or regulations they are instructed to enforce.

Sentinels must keep themselves on the alert, observing everything that takes place within sight and hearing of their post. They will carry their arms habitually at support, or on either shoulder, but will never quit them. In wet weather, if there be no sentry-box, they will secure arms.

No sentinel shall quit his post, nor hold conversation not necessary to the proper discharge of his duty; nor shall he suffer any one to converse with prisoners under his charge without permission from competent authority.

It is the duty of a sentinel to repeat all calls made from posts more distant from the main body of the guard than his own, and no sentinel will be posted so distant as not to be heard by the guard, either directly or through other sentinels.

Sentinels of the police guard pass the call every half-hour from tattoo until reveille unless otherwise directed.

In case of disorder a sentinel must call out the guard: and if a fire takes place, he must cry "Fire," adding the number of his post. If in either case the danger be great, he must discharge his piece before calling out.

When a fire breaks out, or any alarm is raised in a garrison (or camp), all guards are to be immediately under arms.

After retreat (or the hour appointed by the commanding officer) until broad daylight a sentinel challenges every person who approaches him, taking at the same time the position of *charge bayonet*. He will suffer no person to come nearer than within reach of his bayonet until the person has given the countersign or is passed by an officer or non-commissioned officer of the guard.

A sentinel in challenging will call out "*Who comes there?*" If answered "*Friend, with the countersign*," and he be instructed to pass persons with the countersign, he will reply "*Advance, friend, with the countersign!*" If answered "*Friends*," he will reply "*Halt, friends! Advance one with the countersign.*" If answered "*Relief*," "*Patrol*," or "*Grand rounds*," he will reply "*Halt! Advance, sergeant (or corporal) with the countersign!*" and satisfy himself that the party is what it represents itself to be. If he have no authority to pass persons with the countersign, if the wrong countersign be given, or if the persons have not the countersign, he will cause them to stand, and call "*Corporal of the guard!*" If the proper countersign is given the sentinel will bring his piece to a carry and say "*Countersign is right.*"

When any person approaches a post of the guard at night, the sentinel before the post, after challenging, causes him to halt until examined by a non-commissioned officer of the guard. If it be the officer of the day or any other officer entitled to inspect the guard and to make

the rounds, the non-commissioned officer will call "*Turn out the guard!*" when the guard will be paraded, arms at a carry, and the officer of the guard, if he thinks necessary, may demand the countersign and parole.

GRAND ROUNDS.

Any general officer, or the commander of a post or garrison, may visit the guards of his command and go the grand rounds, and be received in the same manner as prescribed for the officer of the day.

The officer of the day, wishing to make the rounds, will take an escort of a non-commissioned officer and two men. When the rounds are challenged by a sentinel, the sergeant will answer "*Grand rounds!*" and the sentinel will reply "*Halt, grand rounds! Advance, sergeant, with the countersign!*" Upon which the sergeant advances and gives the countersign. The sentinel will then cry "*Advance rounds!*" and stand at a carry till they have passed.

When the sentinel before the guard challenges and is answered "*Grand rounds!*" he will reply "*Halt, grand rounds! Turn out the guard; grand rounds!*" Upon which the guard will be drawn up with arms at a carry. The officer commanding the guard will then order a sergeant and two men to advance; when within ten paces the sergeant challenges. The sergeant of the grand rounds answers "*Grand rounds!*" The sergeant of the guard replies "*Advance, sergeant, with the countersign.*" The sergeant of the rounds advances alone, gives the countersign, and returns to his round. The sergeant of the guard calls to his officer "*The countersign is right,*" on which the officer of the guard calls "*Advance, rounds!*" The guard being at a carry, the officer of the rounds advances alone to the officer of the guard, who keeps his post, and gives to him the parole. He then examines the guard, orders back his escort, and, taking a new one, proceeds in the same manner to other guards.

All material instructions given to a sentinel on post by persons entitled to make grand rounds will be promptly reported to the commander of the guard.

COMPLIMENTS FROM GUARDS AND SENTINELS.

The sentinel at any post of the guard, when he sees any body of troops, or any officer entitled to compliment, approach, will call "*Turn out the guard!*" and announce who approaches.

When general officers, or persons entitled to a salute, pass guards while in the act of relieving, both guards are to salute, receiving the word of command from the senior officer of the whole.

When general officers, or officers entitled to a salute, pass in rear of a guard, it does not salute, but stands at a carry, facing to the front.

All guards turn out under arms when armed parties approach their post, and to parties commanded by commissioned officers they present arms, the officers saluting.

The national or regimental colors passing a guard are saluted, the trumpets or field-music sounding a march.

In the day-time, when the sentinel before the guard sees the officer of the day approach he will call "*Turn out the guard; officer of the day.*" The guard will be paraded and salute with presented arms.

The guard of a camp or garrison turns out and presents arms to the commander of the camp or garrison whenever he approaches its post.

All guards and sentinels will pay the same compliments to the officers of the Navy, Marines, Volunteers, and Militia, in the service of the United States, as are directed to be paid to the officers of the Army, according to their relative ranks.

Between reveille and retreat sentinels (not in sentry-boxes) armed with the saber will salute all officers by presenting the saber; if armed with the rifle or car-

bine, they will, under similar conditions, present arms to general and field officers, to the commanding officer of the post, and to the officer of the day, and will give all other officers the sergeant's salute prescribed in tactics.

When a sentry in a sentry-box sees an officer approaching, he will stand at attention except during the time of challenging at night, and, if armed with a rifle or carbine, will salute as the officer passes, by bringing the left hand briskly to his piece, as high as the right shoulder.

Guards do not turn out as a matter of compliment after sunset; nor will any compliments be paid by the guard except as prescribed for grand rounds between retreat and reveille.

Between retreat and reveille, except when challenging, a sentinel (not in a sentry-box) will, when an officer approaches, face outward from his post, and stand steadily at a carry, until the officer has passed.

ATTACK OF GRAND GUARD.

In case the grand guard is attacked, the following disposition should be made:

(1) The outposts move to the support of the sentinels, forming as skirmishers.

(2) The small posts move forward to the outposts, and sentinels, skirmishing, retire slowly on the small posts.

(3) The grand guard moves forward to support of small posts at any necessary or proper point, or the small posts retire, fighting, to the position chosen for defense by the grand guard, as circumstances may determine, the judgment of the officer governing, of course.

(4) Should the attack be so strong that the whole grand guard is compelled to retire, then each line will retire fighting.

(5) The grand guard joins its camp when in line or when a sufficient number of troops have reached the ground it defends.

CHAPTER V.

CEREMONIES.

Commands and Reports for Brigade Dress Parade—For Battalion Dress Parade—Undress Parade—Guard-Mounting—Undress Guard-Mounting—Grand Guard-Mounting—Field Officer of the Day—Officer of the Day—Officer of the Guard—Sergeant of the Guard—Corporal of the Guard—Details for Service—Honors—Salutes.

Chapter V.

CEREMONIES.

COMMANDS AND REPORTS FOR BRIGADE DRESS PARADE.

Adjutant-General. (1) *Guides*, (2) *Posts*.

Battalion Commanders (successively).* (1) *Order* (2) *Arms;* (3) *Parade rest.*

Adjutant-General. (1) *Battalions*, (2) *attention;* (3) *Carry* (4) *Arms.*

Adjutant-General. (1) *Present* (2) *Arms.*

Adjutant-General. [In brigade dress parade, the adjutant-general in facing about faces to the left about.] *Sir, the parade is formed.*

Brigade Commander. *Take your post, sir.*

Brigade Commander. (1) *Carry* (2) *Arms*, &c.

Brigade Commander. (1) *Order* (2) *Arms.*

Adjutant-General. (1) *Adjutants to the front and center;* (2) *March.*

Adjutant-General. *Report.*

Adjutants (successively). —— *Battalion present or accounted for;* or, —— *battalion*, —— *officers or enlisted men are absent.*

Adjutant-General. (1) *Adjutants to your posts;* (2) *March.*

Adjutant-General. *Sir, all are present or accounted for;* or, *Sir*, —— *officers and enlisted men are absent.*

Brigade Commander. *Dismiss the parade, sir.*

Adjutant-General. *Parade is dismissed.*

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* Arms are not brought to a support in brigade dress parade, but are in battalion dress parade. (*Vide Tactics.*)

ADJUTANT-GENERAL. (1) *Forward*, (2) *Guide center*, (3) *March*.

ADJUTANT-GENERAL. (1) *Officers*, (2) *Halt*.

COMMANDS AND REPORTS FOR BATTALION DRESS PARADE.

ADJUTANT. (1) *Guides*, (2) *Posts*.

ADJUTANT (to first captain). *Bring your company to parade rest*.

EACH CAPTAIN (successively). (1) —— *Company*, (2) *Carry* (3) *Arms*; (4) *Order* (5) *Arms*; (6) *Parade* (7) *Rest*.

ADJUTANT. *Sound off*.

ADJUTANT. (1) *Battalion*, (2) *Attention*; (3) *Carry* (4) *Arms*; (5) *Rear open order*, (6) *March*.

ADJUTANT. *Front*.

ADJUTANT. (1) *Present* (2) *Arms*.

ADJUTANT. *Sir, the parade is formed*.

COMMANDING OFFICER. *Take your post, sir*.

COMMANDING OFFICER. (1) *Carry* (2) *Arms*, &c.

COMMANDING OFFICER. (1) *Order* (2) *Arms*.

ADJUTANT. (1) *First sergeants*, (2) *to the front and center*, (3) *March* (or, *double time, March*).

ADJUTANT. *Report*.

DRUM-MAJOR. *Band and trumpeters*, or *field music, present or accounted for*; or, —— *musicians*, or *trumpeters, absent*.

FIRST SERGEANTS (successively). *Company* (A, &c.) *present or accounted for*; or, —— *sergeants, corporals*, or *privates absent*.

ADJUTANT. (1) *First sergeants*, (2) *To your posts*, (3) *March*; (or, *double time, March*).

ADJUTANT. *Sir, all are present or accounted for*; or, *Sir,* —— *officers or enlisted men are absent*.

COMMANDING OFFICER. *Publish the orders, sir*.

ADJUTANT. *Attention to orders*.

ADJUTANT. *Sir, the orders are published*.

COMMANDING OFFICER. *Dismiss the parade, sir*.

ADJUTANT. *Parade is dismissed.*
ADJUTANT. (1) *Forward,* (2) *Guide center,* (3) *March.*
ADJUTANT. (1) *Officers,* (2) *Halt.*

UNDRESS PARADE.

In bad weather undress parade takes the place of dress parade.

The companies fall in without arms on their respective parade grounds, and after the roll is called each company is dressed to the right by its captain, who then places himself in front of its center and brings it to parade rest.

The field music is assigned a position by the adjutant, and when all the companies have come to parade rest he orders the music to *sound off,* at which the retreat is sounded, the adjutant standing at *parade rest.*

The captain of each company then brings his company to attention, and directs the first sergeant to dismiss it.

If orders are to be published the companies close in as soon as the roll is called and are dressed by the captains on a company previously designated.

The line being formed, the adjutant brings it to *parade rest,* orders the music to *sound off,* after which he brings the battalion to attention, publishes his orders and directs the captains to dismiss their companies. Whereupon the officers retire and the companies are marched to their parade ground by the first sergeant and there dismissed.

COMMANDS AND REPORTS FOR GUARD-MOUNTING.

DETAIL SERGEANT. (1) *Rear open order,* (2) *March.*
DETAIL SERGEANT. *Front.*
DETAIL SERGEANT. *The detail is correct,* or —— *sergeants, corporals,* or *privates, are absent.*
SERGEANT-MAJOR. (1) *Count,* (2) *Fours.*

SERGEANT-MAJOR. (1) *Right* (2) *Dress*, (3) *Front*.

SERGEANT-MAJOR. *Sir, the details are correct;* or, *sir, —— sergeants, corporals,* or *privates, are absent.*

ADJUTANT. *Take your post.*

ADJUTANT. (1) *Officers and non-commissioned officers to the front and center,* (2) *March.*

ADJUTANT. *Senior officer, commander of the guard, and chief of the first platoon; junior officer, chief of the second platoon; senior sergeant, right guide, and guide of the first platoon; second sergeant, left guide, and guide of the second platoon; the remaining non-commissioned officers as file-closers of the first and second platoons.*

ADJUTANT. (1) *Officer and non-commissioned officers,* (2) *To your posts,* (3) *March;* or (if but one officer of the guard), (1) *Non-commissioned officers,* (2) *To your posts,* (3) *March.*

ADJUTANT. *Inspect your guard, sir.*

COMMANDER OF GUARD. (1) *Order* (2) *Arms;* (3) *Inspection,* (4) *Arms.* If there are two officers of the guard, the senior may direct the junior to inspect the rear rank.

ADJUTANT. (1) *Parade* (2) *Rest;* (3) *Sound off.*

ADJUTANT. (1) *Guard,* (2) *Attention;* (3) *Carry* (4) *Arms;* (5) *Close order,* (6) *March.*

ADJUTANT. (1) *Present* (2) *Arms.*

ADJUTANT. *Sir, the guard is formed.*

NEW OFFICER OF THE DAY. *March the guard in review, sir;* or, *march the guard to its post, sir.*

ADJUTANT. (1) *Platoons right wheel,* (2) *March;* or, (1) *Guard to its post;* (2) *Fours right,* (3) *March;* (or, *double time, march*).

ADJUTANT. *Pass in review;* (2) *Forward;* (3) *Guide right,* (4) *March.*

SENIOR FIRST SERGEANT. (1) *Parade* (2) *Rest.*

SENIOR FIRST SERGEANT. (1) *Supernumeraries* (2) *Attention* (to supernumeraries).

SENIOR FIRST SERGEANT. (1) *Carry* (2) *Arms.*

COMMANDER OF GUARD. (1) *Continue the march ;* (2) *Left into line, wheel,* (3) *March;* (4) *Forward* (5) *March;* (6) *Guide right.*

COMMANDER OF GUARD. (1) *Fours right,* (2) *March;* or, (1) *Right forward,* (2) *Fours right,* (3) *March.*

COMMANDER OF OLD GUARD. (1) *Present* (2) *Arms.*

COMMANDER OF NEW GUARD. (1) *Carry* (2) *Arms.*

COMMANDER OF NEW GUARD. (1) *Fours left, March;* (2) *Guard,* (3) *Halt;* (4) *Left* (5) *Dress,* (6) *Front.*

COMMANDERS OF BOTH GUARDS. (1) *Present* (2) *Arms.*

COMMANDERS OF BOTH GUARDS. (1) *Carry* (2) *Arms;* (3) *Order* (4) *Arms.*

UNDRESS GUARD MOUNTING.

In bad weather, at night, or after long marches, undress guard mounting will replace dress guard mounting. It is conducted on the same principles as the latter, except that the field music sound off standing on the right of the guard, and that the division into platoons and the march in review are omitted. At the discretion of the commanding officer the music may also be dispensed with.

GRAND GUARD MOUNTING.

Grand guard mounting is conducted on the same principles as battalion guard mounting.

Each battalion detail is assembled on its parade ground, inspected by the battalion adjutant, and then marched to the general parade by the senior officer or non-commissioned officer of the detail.

On arriving in line the detail is brought to rear open order by its officer, who then places himself two yards in front of its center, without reporting to the staff officer.

Upon arriving in line the guides place themselves in the line of file-closers.

A staff officer counts the files, verifies the details by

reference to written orders, causes the guard to count fours, divides it into two or more platoons, leaving a space between each platoon for its guide, and then dresses it to the right. The space left between platoons for the guide is temporarily filled by a file-closer.

The officers and non-commissioned officers then advance to the front and center by command of the staff officer, and are assigned their duties as indicated in the form for battalion guard mounting.

Each platoon is inspected by its commander, after which the guard is brought to close order, arms presented, the carry resumed, then formed into platoons and marched in review.

FIELD OFFICER OF THE DAY.

The duties of field officer of the day are similar to but more comprehensive than those of the battalion officer of the day.

The former is to the brigade what the latter is to the battalion.

His tour of duty is usually for twenty-four hours. In that period he should visit all parts of the command one or more times, and report everything of a commendatory or censurable nature to the commander-in-chief.

In camp he has the immediate superintendence of the battalion camps, as to order, cleanliness, and health. He should go through all company and other streets, see to their cleanliness, the condition of their sinks, &c. He should visit the kitchens, hospitals, and all places occupied by the men.

Having authority, he has no excuse for leaving the encampment at the end of his tour in any other than a well policed, orderly, and healthy condition.

He should see that the grand and camp guards do their duty and that a uniform system of instructing sentinels is established in all the battalions.

On the march he has general superintendence of the supply train and the rear guard. The battalion officers of the day are the assistants of the field officer of the day.

THE OFFICER OF THE DAY.

Both the old and the new officer of the day must be present at guard mounting. While the old guard is being relieved, they inspect the guard-house or tents, and verify the number of prisoners. They then proceed to report to the commanding officer, where the officer relieved presents the report of the officer of the guard, upon which he previously makes such remarks as circumstances require. At the same time, the new officer of the day receives his instructions.

The officer of the day is responsible for the enforcement of the police regulations, and the cleanliness of the post or camp. Fatigue parties will be furnished him when the number of extra-duty men is insufficient for police purposes.

The officer of the day visits the guards during the day at such times as he may deem necessary, and makes his rounds at night at least once after 12 o'clock.

The officer of the day must see that the officer of the guard is furnished with the parole and countersign before retreat.

OFFICER OF THE GUARD.

The officer of the new guard divides the guard into three reliefs, numbers them first, second, and third, from right to left, and directs a list of the guard to be made; experienced men are placed over the arms of the guard and at the remote and responsible posts; the officer of the guard then proceeds to take possession of the guard-house or guard-tent, and the articles and prisoners in charge of the guard.

Each relief, before being posted, is inspected by the

commander of the guard. The corporal reports to him, and presents the old relief on its return. If the sentinels are numerous, the sergeants are employed as well as the corporals in relieving them.

During the time of relieving the sentinels and of calling in the small posts, the old commander of the guard will give to the new all the information and instructions relating to his post.

After the sentinels and outposts of the old guard have been relieved the commander of the new guard will visit them, and question the non-commissioned officers and sentinels relative to the instructions they may have received from the old guard.

Officers are to remain constantly at their guards, except while visiting their sentinels, or necessarily engaged elsewhere on their proper duty.

Commanders of guards leaving their posts to visit their sentinels, or on other duty, are to mention their intention and the probable time of their absence to the next in command.

The officer of the guard will inspect his guard at reveille and retreat.

He must see that the countersign is duly communicated to the sentinels at the proper time before twilight.

The officer of the guard will make a report of his tour of service, including the outposts, and present it to the officer of the day.

SERGEANT OF THE GUARD.

The sergeant of the guard has general supervision of the corporals and members of the guard. He sees that the reliefs turn out at the proper time, carries the keys of the prison, receives the prisoners, sees that they are properly secured, and that their sentences are carried out each day; that all regulations affecting prisoners and guard police duties are rigidly enforced.

He prepares the guard report for the officer of the guard, and is immediately responsible for all property on charge.

When in command of a guard the sergeant's duties are in most respects similar to those of the officer of the guard.

It is recommended that all officers be cautious of reproving non-commissioned officers in the presence or hearing of privates, lest their authority be weakened; and non-commissioned officers are not to be sent to the guard-room and mixed with privates during confinement, but to be considered as placed in arrest, except in aggravated cases, where escape may be apprehended.

CORPORAL OF THE GUARD.

Corporals of the guard should be perfectly familiar with the duties of sentinels and competent to instruct them.

The sentinels are regularly posted and relieved by the corporals and they should be held severely responsible for any neglect of duty. They are required to promptly report to the officer of the guard all disobedience of orders on the part of sentinels.

They impart the countersign to the reliefs on post at the time for challenging and see that each man is familiar with his night orders.

The following method of posting and relieving sentinels is taken from paragraph 818, Upton's Tactics:

The first relief having been designated and brought to a carry, its corporal commands "Call off." Commencing on the right the men call off alternately, front and rear rank, ONE, TWO, THREE, FOUR, and so on; the corporal then commands, (1) *Right* (2) FACE; (3) *Support* (or *right shoulder*) (4) ARMS; (5) *Forward,* (6) MARCH.

The corporal marches on the left, and near the rear file, in order to observe the march. The corporal of the old guard marches on the right of the leading rank, and

takes command when the last one of the old sentinels is relieved, changing places with the corporal of the new guard. When the relief arrives at 15 yards from a sentinel, he halts and faces to it, with arms at a carry. At 6 yards from him the corporal commands, (1) *Relief*, (2) HALT.

The corporal then adds, according to the number of the post, (1) *No.* (—), (2) *Arms* (3) PORT.

At the third command the two sentinels come to arms port, and approach each other. The old sentinel, under the supervision of both corporals, whispers his instructions to the new sentinel; both then come to a carry; the corporal then commands, (1) *Support* (or *right shoulder*) (2) ARMS; (3) *Forward*, (4) MARCH.

As the relief passes, the old sentinel takes his place in its rear at a support (or right shoulder) arms; the other sentinels are relieved in a similar manner.

ROSTER.

The following rules in regard to the roster apply to service both in garrison and in the field:

All details of service should be by roster, but officers or enlisted men, when detailed, must serve whether roster be kept or not; having performed the service they may appeal to superior authority if they deem themselves aggrieved.

The duties performed by detail are of three classes:

The first class comprises: (1) Grand guard and outposts; (2) interior guards, as of magazine, hospital, &c.; (3) orderlies; (4) police guards.

The second class comprises: (1) Detachments to protect laborers on military works, as field-works, communications, &c.; (2) working parties on such works; (3) detachments to protect fatigues.

The third class comprises general courts-martial, and all fatigues, without arms, in or out of camp.

The rosters are distinct for each class. Officers are named on them in the order of rank. The details are taken in succession in the order of the roster, beginning at the head.

Lieutenants form one roster, and first and second lieutenants are entered on it alternately. The senior first lieutenant is the first on the roster; the senior second lieutenant is the second, &c. The captains form one roster, and are exempt from fatigues, except to superintend issues. A captain commanding a battalion temporarily is exempt from detail, and duty falling to him passes. Lieutenant-colonels and majors are on one roster. They may be detailed for duties of the first and second classes, when the importance of the guards and detachments requires it. In the company, sergeants, corporals, and privates form distinct rosters.

Officers, non-commissioned officers, and soldiers take duties of the first class in the order stated, viz, the first, for the detail, takes the grand guards; the next, the interior guards; the last, the police guard; and the same rule in regard to the details and duties of the second class. In the details for the third class, the senior officer takes the largest party. The party first for detail takes the service out of camp.

When the officer whose tour it is is not able to take it, or is not present at the hour of marching, the next after him takes it. When a guard has passed the chain of sentinels or an interior guard has reached its post, the officer whose tour it was cannot then take it. He takes the tour of the officer who has taken his. When an officer is prevented by sickness from taking his tour, he becomes first for detail on being restored to duty, the general rule being that the officer longest off duty is the first for detail. These rules apply equally to non-commissioned officers and soldiers.

Duties of the first and second classes are credited on the

roster when the guards or detachments have passed the chain of sentinels, or an interior guard has reached its post; fatigue duties when the parties have passed the chain or begun the duties in camp.

Every officer, non-commissioned officer, or soldier, on duty of the first class, or who is of the next detail for such duty, takes, when relieved, the duty of the second or third class that has fallen to him during that time, unless he has marched for detachment of more than twenty-four hours.

Soldiers march with knapsacks on all duties of the first class, and with arms and equipments complete on all working parties out of camp, unless otherwise ordered.

HONORS.

On shore honors will be rendered as indicated below. The President and others of equal rank, the Secretary of the Navy, and the Commander-in-chief should receive a review of all the forces unless otherwise directed. Where one salute only is given it should be fired as soon after the arrival of the personage as possible.

The President: Music, drums beating four ruffles, bands playing the national air. Salutes: Twenty-one guns upon arriving and departing from the camp or garrison.

An ex-President, same as prescribed for the President.

The Vice-President, same as for President, except that he receives but one salute of nineteen guns.

A foreign sovereign or the chief magistrate of any foreign republic, same as prescribed for the President, except that the bands shall play his national air.

Members of a royal family, the same as for their sovereign, except that one salute only shall be fired on leaving.

For the Secretary of the Navy, a salute of nineteen guns.

Members of the Cabinet, Justices of the Supreme Court, or Governors of States, same as prescribed for the Vice-President, except that but one salute of seventeen guns shall be fired on their leaving.

For a committee of Congress officially visiting a camp or garrison, a salute of seventeen guns fired on their leaving.

Ministers representing the United States abroad or Ministers of foreign countries, a salute of fifteen guns fired on their leaving.

A chargé d'affaires or commission, same as for a minister, except that the salute shall be eleven guns.

A consul-general, a salute of nine guns.

A consul, a salute of seven guns.

A vice-consul or a commercial agent, the same as a consul, except that the salute shall be five guns.

Chiefs of bureau of the Navy Department, as such, shall be saluted with eleven guns.

An admiral is entitled to four ruffles on the drums and one salute of seventeen guns; a vice-admiral, three ruffles and fifteen guns; a rear-admiral, two ruffles and thirteen guns; a commodore, two ruffles and eleven guns.

No officer out of uniform shall be saluted with guns or received with troops.

No salute is ever to exceed twenty-one guns.

All salutes must be fired between sunrise and sunset and the national colors must be displayed at the time.

No salute shall be fired in the presence of a senior without his permission, except it be one to such senior.

The interchange of official compliments and visits between foreign military or naval officers and the authorities of a military post are international in character.

In all cases it is the duty of the commandant of a military post, without regard to his rank, to send a suitable officer to offer civilities and assistance to a vessel of war (foreign or otherwise) recently arrived.

After such offer it is the duty of the commanding officer of the vessel to send a suitable officer to acknowledge such civilities, and request that a time be specified for his reception by the commanding officer of the post.

The commanding officer of a military post after the usual offer of civilities, is always to receive the first visit without regard to rank.

Officers of the Army and Marine Corps and officers of volunteers and militia in the service of the United States shall be received agreeably to their relative rank with officers of the Navy.

When an officer entitled to a salute visits a post within his own command, the troops are paraded and he receives the honors of a review unless he directs otherwise.

When a salute is to be given an officer junior to another present at a post, the senior will be notified to that effect by the commanding officer.

Military or naval officers of whatever rank arriving at a military post or station are expected to call upon the commanding officer.

SALUTES.

All officers will salute each other when they meet, the inferior making the first salute.

Officers under arms salute with the sword or hand according as the sword is drawn or in the scabbard.

Officers salute with the sword or hand in making and receiving all official reports, the junior making the first salute.

On official occasions, officers when under arms indoors do not uncover, but they salute with the sword or hand according as the sword is drawn or in the scabbard; when indoors and not under arms, they uncover and stand at attention, but do not salute.

The commanding officer is saluted by all commissioned officers in command of troops or detachments.

Officers in citizens' dress are saluted in the same manner as when in uniform.

Officers on all duties under arms are to have their swords drawn without waiting for any word of command for that purpose. The sword is not drawn unless the men are under arms.

A non-commissioned officer or private in command of a detachment without arms salutes all officers with the hand. If the detachment be on foot, and armed with the rifle or carbine, he brings the piece to a carry, and he salutes as prescribed for a sergeant. If the detachment be armed with the saber he salutes with the saber, if drawn; otherwise as if he were unarmed.

No salutes are rendered when marching in double time.

An enlisted man armed with the saber, when out of the ranks, and not a file-closer, salutes all officers with the saber, if drawn; if not, he salutes with the hand. If on foot, and armed with a rifle or carbine, he salutes as prescribed for a sergeant.

Whenever a non-commissioned officer or soldier without arms passes an officer he salutes him, using the hand farthest from the officer.

A non-commissioned officer or soldier being seated, and without particular occupation, rises on the approach of an officer, faces towards him, and salutes. If standing, he faces toward the officer for the same purpose. If the parties remain in the same place, or on the same ground, such compliments need not be repeated. Soldiers actually at work do not cease it to salute an officer unless addressed by him.

An enlisted man makes the prescribed salute with the weapon he may be armed with, or (if unarmed) with the hand, before addressing an officer. He also makes the same salute after receiving a reply.

Indoors, a non-commissioned officer or soldier, when unarmed, uncovers and stands at attention, but does not

salute; in all other cases he salutes, as heretofore prescribed, without uncovering.

When an officer enters a room where there are soldiers, the word "Attention" is given by some one who perceives him, when all rise and remain standing in the position of a soldier, until the officer leaves the room. Soldiers at meals do not rise.

Officers in citizens' dress are saluted in the same manner as when in uniform.

Soldiers *at all times* and *in all situations* pay the same compliments to officers of the Army, Navy, and Marines, and to all officers of the volunteers and militia in the service of the United States as to officers of their own particular regiments and corps.

Officers will at all times acknowledge the courtesies of enlisted men, and when returning their salute officers salute as prescribed in the tactics. When several officers in company are saluted, all who are entitled to the salute return it.

ESCORTS OF HONOR.

Escorts of honor are detailed for the purpose of receiving and escorting personages of high rank, civil or military. The troops for this purpose are selected for their soldierly appearance and superior discipline.

The escort forms in line, bayonets fixed, the center opposite the place where the personage presents himself, with an interval between the wings to receive him and his staff, the band on the flank of the escort toward which it will march. On the appearance of the personage, he is received with the honors due to his rank. When he has taken his place in the line, the escort is formed into column of companies, platoons, or fours, and takes up the march. On leaving, the escort line is formed, and the same honors are paid as before.

When the position of the escort is at a considerable distance from the point where the person is to be received,

as, for instance, where a court-yard or wharf intervenes, a double line of sentinels is posted from that point to the escort, facing inward; the sentinels successively salute as he passes, and are then relieved and join the escort.

An officer is appointed to attend him, to bear such communications as he may have to make to the commander of the escort.

FUNERAL HONORS.

Funeral escorts ashore should be allowed as follows:

The *brigade commander*, two battalions of infantry and two batteries of artillery. A battalion commander, a battalion; a company commander, one company; subaltern, half a company; non-commissioned staff officer and a sergeant, sixteen privates commanded by a sergeant; corporal, twelve privates commanded by a corporal; private, eight privates commanded by a corporal.

Petty officers should receive escorts according to their assimilated rank.

An officer's escort, when practicable, is commanded by an officer of the same grade.

The following is the order of formation for a funeral procession:

Music.

Firing party (to be composed of marines).

Chaplain.

Pall or hearse.

Escort.

Officers of the vessel to which the deceased was attached, juniors leading.

Officers from the fleet or squadron, juniors leading.

Foreign officers.

Citizens.

CHAPTER VI.

CAMPS.

Laying out the Camp—Internal Arrangement of Camps—Cooking Places—Sinks—Washing and Bathing Places—Daily Routine in Camp and Garrison—Roll Calls—Orders—Fortified Camps—Bivouacs—Cantonments.

Chapter VI.

CAMPS.

A camp is the place where troops are established in tents, in huts, or bivouac.

The camping party is a detachment detailed to prepare a camp for this purpose; each battalion should furnish one commissioned officer, and a petty officer and two men from each company.

The brigade commander will decide whether the battalions shall camp together or separately, and whether the police guard shall accompany the camping party or a larger escort be sent.

If a camping party is to be sent in advance to prepare the camp, the brigade commander gives his instructions to the chief quartermaster, who calls on the battalions for their camping parties, and, if necessary, the engineer officer of the brigade accompanies them to prepare the defenses and communications.

A reconnaissance should precede the establishment of a camp of troops on the march. It is only necessary to look to the health and comfort of the troops, the facility of communication, and the convenience of wood and water.

For an intrenched camp, or one intended to deceive the enemy as to the strength of the force, the ground must be selected and the camp arranged for the object in view. (See Intrenched Camps.)

Sentinels, to be relieved by the guards of the battalions when they come up, should be placed over the water, if it is scarce, and over the houses and stores of provisions in the vicinity.

If the camping party does not precede the brigade, the chief quartermaster should attend to those things as soon as the brigade reaches the point selected for the camp.

The troops should be established in camp as rapidly as possible, particularly after long, fatiguing marches.

On reaching the ground the infantry form on the color front and the artillery is parked near the troops to which it is attached, so as to be protected from attack and to contribute to the defense of the camp. Sentinels for the park are furnished by the artillery and, if necessary, by the other troops.

The number of men to be furnished for guards, pickets, and orderlies; the fatigue parties to be sent for supplies; the work to be done, and the strength of the working parties; the time and place for issues; the hour of marching, &c., are then announced by the brigade commander to the battalion commanders, the adjutant and captains forming in front of each battalion, the first sergeants taking post behind their captains. The adjutant then makes the details, and the first sergeants warn the men. The battalion officer of the day forms the picket and sends the guard to their posts. The colors are then planted at the center of the color line and the arms are stacked on the line; the fatigue parties to procure supplies and the working parties form in rear of the arms; the men not on detail pitch the tents.

If the camp is near the enemy the picket remains under arms until the return of the fatigue parties, and, if necessary, is reinforced by details from each company.

If it is expected to remain in the camp for any length of time its sanitary condition must be carefully observed.

All ponds, swamps, lands recently stripped of their timber, and muddy rivers must be kept at a distance.

The flood-level of the nearest water should also be carefully noticed; weeds and stray bits of drift-wood washed

into the branches of adjacent trees or bushes will serve as guides.

Many streams are subject to sudden and terrific rises, and frequently without any apparent cause.

When camping for the night on a fordable stream with the intention of crossing, make it an invariable rule to cross it before going into camp. A sudden rise or the appearance of the enemy might seriously interfere with the crossing next morning.

A few trees add much to the comfort of a camp.

So far as may be prudent, the camp should, if possible, be protected by bluffs and thickets and the back of the tents placed toward the wind.

In a hostile country the security of the command will depend very much upon the judicious selection of a camp as regards its capability of defense. If on the bank of a stream, a concave bend where the water is deep should be selected. In such a position the defending party can cross his fire in case of an attack from the other bank.

If the camp is remote from a stream, a portion of it should rest on the highest hill or bluff within range.

As a rule tents should be pitched on that side of the camp most exposed to attack.

Avoid encamping or bivouacing in grave-yards; get as far to windward of them as possible.

In reporting on proposed sites for encampments, note especially these points: supply of water, quality and quantity; supply of wood and provisions; roads leading to and means of lateral communication; nature of cultivation of soil, shape of ground, and strength or otherwise, as a military position.

THE SELECTION OF A SITE.

The site for a "standing" camp is selected chiefly because it presents certain strategical advantages. The site for a "flying" camp is chosen on account of some tactical advantage the ground may offer.

It is most desirable that such a position should be selected as can neither be commanded nor turned. Before an enemy purely strategical and tactical considerations are of the first importance, but in determining between two sites, in which these may be equal, or nearly so, it should be remembered that the comfort of the men in reference to the nature of the ground they may have to lie on should, in conjunction with sanitary conditions, be the next consideration.

For a camp to be used for one night, and where the enemy is close at hand, military reasons must be all-important; but if the camp is to be used for a longer period or the enemy is not close at hand, sanitary considerations should have due weight in the selection of a position.

MARKING OUT THE CAMP.

Two markers should be detailed from each battalion to mark the site of its camp. One of them should know, and have in writing from the adjutant, the number of files of his battalion in line and the number of paces required for its front. These markers will be collected by a sergeant or petty officer detailed from the brigade for that purpose, who will march them with the support of the advance guard of the column.

On their reaching the ground the staff officer (who should, if possible, know the ground and have a rough sketch of it) will proceed to mark off the camp as follows:

He will place a marker as a base point for the line of tents; the other marker of the same battalion will then measure the distance ordered for its front in the given direction (marching on some fixed point), halt, and face about, the staff officer correcting his covering. The inner marker of the next battalion will take the interval ordered, face about, and cover, the outer marker proceeding as above described, and so on.

When necessary, the staff officer may move up to any marker as a base and dress the other markers in a new direction. When the line is thrown back, sufficient space must be allowed between the battalions adjacent to the angle to prevent the rear of their camps interfering with each other.

When the markers are covered they will fix their flags (or poles) in the ground, firmly between their feet.

All intervals should be measured from tent-pole to tent-pole.

In order to fix the other two points which mark the rear of the ground to be occupied by the battalion, a right angle must be laid out; this may be done either by the eye or with a tape-line.

ARRIVAL OF BRIGADE ON THE GROUND.

On approaching the camping ground the battalion adjutants should go forward and ascertain from the markers of their respective battalions (who must be on the look-out) the position their battalion is to take up. Each should then return to his battalion and conduct it to its position.

FORM OF ENCAMPMENT.

The following principles should govern the disposition of a camp:—

(1) The means of passing freely through the camp should be maintained.

(2) The tents, bivouacs, or huts, should be disposed with a view to the greatest amount of order, cleanliness and salubrity.

(3) The camp should be as compactly arranged as possible, consistently with the above considerations.

LAYING OUT THE CAMP.

In the presence of the enemy the troops bivouac in line of battle (see Bivouac); if safety permits, the tents may be pitched immediately in rear of the line of stacks,

the tents of the company officers in rear of their companies, the tents of the field and staff in rear of the center of the line of company officers.

When not in the presence of the enemy, each battalion should camp in column of companies.* The tents of each company are arranged in two lines facing each other. The company officers' tents are arranged in line parallel to the flank of the column, facing the company streets; the tent of the captain of each company is to the right (or left) of the line passing through the center of the street, according as the officers are on the right (or left) flank of the column; his lieutenant is on his right (or left). The first sergeant's tent is on the flank of the company toward the officers' tents.

The tents of the field and staff, when practicable, are in line parallel to those of the company officers and directly in rear of them; the battalion commander is opposite the center of his battalion; the other field officers (if there are any) are on his right, the adjutant on his left, and the other staff officers on the left of the adjutant. (See Plate VI.)

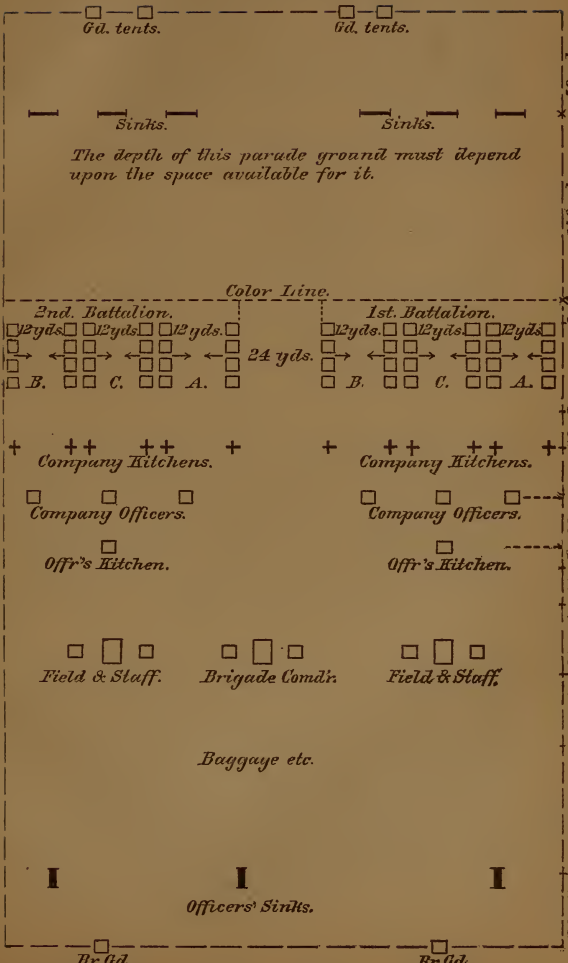
The kitchens of the men are in line on the same flank as the company officers; the sinks for the men are outside of the color line.

The kitchens of the officers are in rear of their tents; the sinks for the officers are in rear of the line of tents of the field and staff.

The depots, both of provisions and munitions, should be placed in a central position with easy access to all parts of the camp.

The terms front, flank, right, left, file, and rank, have the same meaning when applied to camps as to the order of battle.

*According to Upton's Infantry Tactics, battalions should camp in column of divisions; but it is thought that the method here uggested is better adapted to the purposes of a naval brigade than he one indicated in the Tactics.

PLATE VI.

Camp of a Naval Brigade in column of companies.

The front of the camp is usually equal to the front of the troops. The tents are arranged in ranks and files. The number of ranks varies with the strength of the companies and the size of the tents.

No officer will be allowed to occupy a house, although vacant, on the ground of his camp, except by permission of the commander of the brigade.

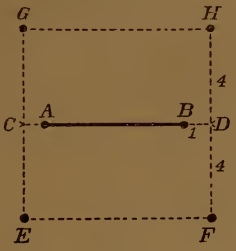


Fig. 1.

To properly pitch the ordinary wall tent, place the ridge pole A B on the ground approximately beneath its place when in position. Drive pegs at A and B. From A and B continue A B to C and D, by stepping one pace from each end. From C and D make four paces at right angles with C D on each side, and determine the points E, F, G, and H. At those points drive the corner tent pegs.

In pitching tents disturb the ground inside and around as little as possible.

In camps where tents and not huts are used, it is advisable to supply planking when practicable for the men to lie on (they should be removed and dried every five days). If boards cannot be had use rubber blankets, or any sort of tarpaulin may be used. If straw is plentiful issue enough for the men to make good thick mats to lie on; they should be 6 feet long and 2 feet wide (72 pounds of straw is sufficient for each five men).

The tents for men should be placed as far from each other as the dimensions of the camp permit (never less than two paces). Crowding is always injurious to health. No refuse, slops, or excrements should be allowed to be deposited in the trenches for drainage around the tents. Each tent should be thoroughly swept out daily and the materials used for bedding aired and sunned, if possible. The canvas should be raised freely at its base, and it should be kept open as much as possible during the daytime in dry weather, in order to secure ventilation; for tents are liable to become very unhealthy if not constantly and thoroughly aired. Free ventilation of tents should be secured at night, by opening and raising the base of the tent to as great an extent as the weather will permit. In rainy weather the fly may always be rolled up on the leeward side of the tent.

The crowding of men in tents for sleeping is highly injurious to health, and will always be prevented by a commanding officer who is anxious for the welfare of his men.* Experience has proved that sleeping beneath sim-

* It is the duty of every officer to make the health and comfort of the men under his command an object of special care and unceasing thought.

He should study to arouse in them a feeling of self-respect and professional pride; show a lively interest in whatever concerns them, and take every opportunity to publicly commend a deserving man.

If men feel that their officers are personally interested in them, that they can even come to them with their little grievances, sure of proper sympathy and advice, they will not only respect, but have an affection for them; and especially if, in addition, these officers share their comforts with, and accept the hardships and privations of, their men, if necessary, in active service, they can enthuse and lead them where others would utterly fail.

To this personal interest in their men many great commanders have owed much of their popularity and success; and, indeed, it is doubtful whether any great and continued success has been attained by any officer who has been careless of, or indifferent to, the welfare, wants, and feelings of his men.

ple sheds of canvas, or even in the open air, is less dangerous to health than overcrowding in tents.

The men should sleep in their shirts and drawers, removing their shoes, stockings, and outer clothing, except when absolutely impracticable. Sleeping in the clothes is never so refreshing, and is absolutely unhealthy.

The utmost attention should be paid by commanders of companies to the cleanliness of their men, as to their persons, clothing, or tents. Where conveniences are to be had, the men should bathe once or twice a week; the feet should be washed at least twice a week, the hair kept short, and the beard neatly trimmed. Dirty clothes should be kept in an appropriate part of the knapsack or locker, and no article of any kind put under the bedding.

Every morning all tents should be aligned, and, unless raining, the sides of the tents should be rolled up all around.

In fine weather strike tents frequently; it is good practice for the men and is advisable as a sanitary measure, as the ground where the tent usually stands can then be well dried by the sun.

Do not permit grass or green leaves to be used for beds in tents.

Previous to retiring for the night all tent ropes should be slacked off a little, as the rain or dew will tighten them enough to draw the pegs and strain if not tear the canvas.

At night and during wet weather all the arms should be replaced in the tents and fastened with a string around the tent poles.

In sandy places it is difficult to keep tents standing in a high wind, as the pegs draw. If the ropes are fastened to large stones or bushes buried in the ground they will act as a species of anchor, and will probably serve to keep the tents erect.

INTERNAL ARRANGEMENT OF CAMP.

From the moment the tents are up every exertion should be made to carry out all the works that are required in standing camps, as follows:

(1) Tents should be neatly pitched, according to order.

(2) Cooking places marked out and a kitchen constructed for each company.

(3) Sinks dug.

(4) A trench, 4 inches deep, dug around the outside of each tent.

(5) The natural drainage so improved that all water flowing from the tents into the small drains round them should be led off by deeper drains into the nearest ravine or rivulet.

(6) Make racks for arms in front of each company's tents.

(7) Make paths with stones in front of each row of tents (if necessary).

(8) Erect sentry boxes or sheds.

WORKING PARTIES.

On arriving at the ground selected for the camp the following parties should be told off and paraded by the adjutant:

Cooking party: Two men per company, under a non-commissioned or petty officer.

Sink party: All the pioneers who carry pickaxes and shovels and two men per company, in charge of a non-commissioned or petty officer.

Water party: Two men per company, under a non-commissioned or petty officer.

Ration party: Two men per company, under a non-commissioned or petty officer.

Wood party: Two men per company, or more if necessary, under a non-commissioned or petty officer.

The cooking party will at once commence the kitchens and the sink party the sinks. The ration party will go to the depot and receive the rations, and the wood party will, if no fuel is issued, seek for and bring it to the kitchen.

COOKING PLACES.

Each company should have its own kitchen in rear of and in line with its own row of tents.

The simplest kitchen consists of a trench dug in the direction that the wind is blowing, of such width that the kettle when placed on it should not rest above an inch on each side.

The fire is lit at the end where the trench is deepest; it should not extend beyond 3 or 4 feet up the trench. The kettles are placed touching one another along the trench; dry sods should be used to stop up the chinks made by the roundness of the kettles, so that the space under them may form a flue.

It is advisable to pile up sod, or with stones and earth erect a chimney at least 1 foot in height at the end away from the fire. All grass round the fire-place should be cut to prevent accidents from fire.

Near the working places a small *filth hole* should be dug as a receptacle for all cooking refuse, potato peelings, &c. It should be filled up with earth every two or three days and a new one made.

Firewood should be cut into lengths of 1 foot and about 2 inches square. Where nothing but brush wood is to be had, the trench must be deepened where the fire is lit. Barrels can be used when no other fuel can be had. (For description of field ovens see Chapter XII.)

In estimating for fuel (for cooking purposes) estimate 3 pounds of wood or coal per man; when latter is used, will require 1 pound of kindling wood to each 36 pounds of coal.

SINKS.

As soon as the place has been marked out for them, they should be commenced by fatigue parties. Those constructed at first should be 2 feet wide at top and 1 foot at bottom, 2 feet deep and about 12 paces long. The earth, as it is dug out, should be thrown so as to form a bank in the rear and sides.

If the force halts for more than one day, sinks on a larger scale must be constructed; they should be 6 feet deep, and 1 foot wider at top and bottom than the smaller ones. If possible a rail or post of some kind should be erected along the edge for the men to sit on; it should be about 18 inches above the ground, and supported by forked sticks at the end; another should be laid on the ground for their feet to rest on. If trees or brush are near, it should be inclosed by a screen about 4 feet high, and if time permits roofed in also.

The strictest orders should be given to prevent men committing nuisances in the camp or its intervals; men doing so should be invariably punished.

In a standing camp a urinal should be established.

Twice a day (about 10 a. m. and 6 p. m.) the bottom of each pit should be covered with a 3-inch layer of earth (not sand); the wood ashes from the fires should be spread about in the vicinity, particularly where the men's feet rest within the inclosure. If lime is to be had, it should be used in large quantities. When a sink becomes nearly full it should be carefully filled in with earth, well trodden down, but having a small mound over the spot to mark it.

The health and comfort of every one in camp depends very much upon the manner in which these duties are performed.

WASHING AND BATHING PLACES.

If the supply is from a running stream, great care should be taken to prevent men from washing clothes or bath-

ing in it above the point where the drinking water is to be drawn.

Two points should at once be marked off; above the first, water for drinking and cooking should be drawn, and below the second all bathing and washing should be carried on.

Two barrels, one inside the other, having a space between them of 4 or 6 inches all round, filled in with layers of sand, gravel, and charcoal, form an excellent filter.

The inside barrel should have no bottom, and should rest on three stones placed in layers of sand, charcoal and coarse gravel.

The amount of water required for drinking purposes is 6 pints per man in temperate zone, and 8 pints per man in the tropics. In stationary camps, where water is abundant, each man should be allowed 5 gallons for all purposes.

DISTINGUISHING FLAGS.

The headquarters of the brigade commander should be indicated by a flagstaff with a square red flag.

The headquarters of a battalion commander should be indicated by a flagstaff with a triangular red flag.

The commissary and quartermaster department of a brigade should be indicated by a square blue flag, and of a battalion by a triangular blue flag.

At night these distinguishing flags should be replaced by red and blue lights, as follows: Brigade commander, 2 red lights; battalion commanders, 1 red light; brigade commissary and quartermaster, 2 blue lights; battalion quartermaster and commissary, 1 blue light.

DAILY ROUTINE IN CAMP OR GARRISON.

Roll-calls.

There shall be daily at least three roll-calls, viz, at reveille, retreat, and tattoo. They will be made on the

company parades by the first sergeants, superintended by a commissioned officer of the company.

At all established roll-calls, except dress parade, after the companies are dismissed, each officer superintending the company roll-call reports to the adjutant or other officer designated, the result of the roll-call; the adjutant or other officer designated reports the result of the roll-call to the commanding officer.

Immediately after reveille roll-call the tents or quarters and the space around them will be put in order by the men of the companies, superintended by the chiefs of squads, and the guard house or guard tent by the guard or prisoners.

The morning reports of companies, signed by the captains and first sergeants, will be handed to the adjutant before 8 o'clock in the morning, and will be consolidated by the adjutant within the next hour, for the information of the battalion commander, and if the consolidation is to be sent to higher authority, it will be signed by the battalion commander and the adjutant.

The duties in camp and garrison are to be conducted as far as practicable in the same manner and on the same principles.

The brigade commander establishes the hours for the different calls, having regard to the season and circumstances.

(1) *Reveille* is usually sounded about sunrise.

(2) *Surgeon's call* in time to allow the first sergeant to obtain from the surgeon a list of the men they are to report as sick on their morning report.

(3) *Breakfast call* should be sounded as soon after reveille as practicable, allowing the troops time to wash themselves and put their tents or quarters in order. Usually no work or drill will be ordered before breakfast.

(4) *First Sergeant's call* is the signal for the morning reports to be sent in to the battalion headquarters.

(5) *Troop* is the signal for morning parade. If the guard is mounted in the morning, guard mounting should follow troop parade.

(6) *Fatigue* is the signal for policing camp or quarters, and for working parties to commence work.

(7) *Drill call* is usually sounded after the morning fatigue duties have been performed, or after dinner.

(8) *Assembly*, signal to form by companies.

(9) *Recall from drill* is the signal for drill to cease.

(10) *Dinner call*, usually at noon.

(11) *Retreat* at sunset, when the troops should appear under arms, weather permitting; orders and detail for the following day are published then.

(12) *Supper call* generally follows parade.

(13) *Tattoo* not earlier than 9 nor later than 10.30 p. m.

(14) Taps from fifteen to thirty minutes after tattoo.

(15) *The long roll* is the signal of alarm. In active service the command should turn out under arms, otherwise without them.

(16) *The general* is the signal to break camp and prepare to march.

The call for the assembly of musicians should be sounded five minutes before the time for the stated calls.

The reliefs off post at reveille should be allowed fifteen minutes to return their bedding to camp or garrison, one relief being kept back until the other returns. (This applies only to police guards).

CAMP POLICE.

No traffic of any kind should be allowed along the front of a camp, or through the tents. All carts, wagons, and horses, should pass through the intervals, and along the rear. A place for a market should be selected and named in orders. All persons coming to the camp to sell articles of any kind must be confined to this place and not al-

lowed to wander about the camp. The camp police should arrest all persons found wandering, and a guard under arms should remain at the market until it is cleared.

A tariff of prices, at which various articles may be sold, should be arranged by the brigade commander or some officer appointed by him, and no departure from this should be allowed, all articles being paid for in ready money.

ORDERS.

The orders of commanders of brigades are either general or special. Orders are numbered general and special, in separate series, each beginning with the year. Those issued by commanders of posts, battalions, companies, or detachments are simply denominated "orders," and numbered in one series, beginning with the year. General orders announce the time and place of issues and payments; hours for roll-calls and duties; the number and kind of orderlies, and the time when they shall be relieved; police regulations, and the prohibitions required by circumstances and localities; returns to be made, and their forms; laws and regulations, promotions and appointments; eulogies or censures to corps or individuals, and generally whatever it may be important to make known to the whole command.

Special orders are such as do not concern the troops generally; such as relate to the march of some particular corps, the establishment of some temporary post, the detaching of individuals, the granting requests, and generally such matters as need not be published to the whole command.

A general order, and an important special order, must be read and approved by the officer whose order it is, before it is issued by the staff officer.

An order will state at its head whether it is special or general, its number, date, and place of issue, and at its

foot the name of the commander by whose authority it is issued.

An order may be put in the form of a letter addressed to the individual concerned, through the proper channel. Such orders should be in strict military—not semi-official—form.

BIVOUACS.

In fine weather the bivouac is more healthy than the camp, particularly if operating in a wooded country where fires can be maintained easily.

In selecting a site for a bivouac wood and water are the great requisites; but a good supply of the former is essential, as it is robbed of half its enjoyment unless the men can have large fires to sleep near. This is all the more essential if the nights are cold.

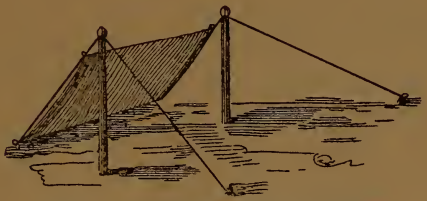


Fig. 2.—Rubber blanket as a shelter tent.

The fires should be so constructed as not to be seen from the distance, to be quickly extinguished, to admit of many gathering around them, and at the same time to economize fuel. As a rule, if warmth is desired, see that the fire is kept close to the ground; if light is wanted, elevate it 1½ or 2 feet above the ground.

In wet weather sufficient dry fuel may be found in most cases, under logs, rocks, or leaning trees. When no dry place can be found, the fire should be started in a pan or kettle and then transferred to the ground.

When camping or bivouacing in a hilly or undulating

country remember that the actual cold is greater in the valley than on the side of the hill; half way up the slope is generally the best site for comfort as well as for military reasons.

Narrow belts of wood in front form a good screen both from the wind and the enemy's observation.

As a rule the form of bivouac should, as nearly as possible, be that of a camp. (See Plate VII.)

If near the enemy it may be desirable to bivouac in line of battle, in which case the fighting line bivouac in front and the second line and reserve at their proper intervals in rear.

The artillery should be posted in its proper place in the lines ready to engage the enemy at a moment's notice.

When liable to surprise, the infantry should stand to arms at daybreak.

If arms are to be taken apart to clean it must be done by detachments successively.

When detached without canvas for a long period the spare time should be spent in making temporary houses.

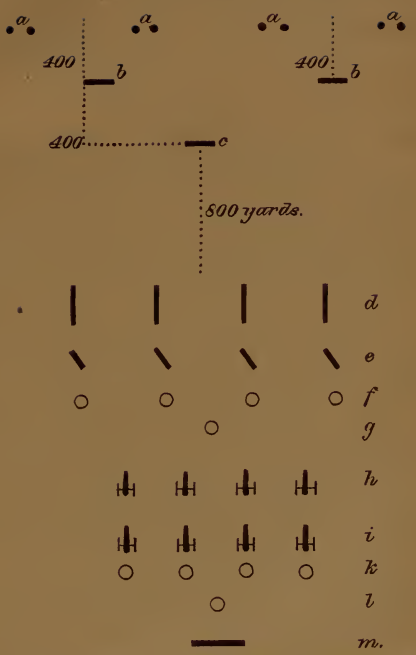
When space is available and time permits, a good method is to dig a circular trench about 15 feet in diameter, the earth being thrown up so as to form a bank 2 or 3 feet high. The sod should be carefully cut and placed so as to revet the interior slope. A way in should be left, and the fire lighted in the middle, the men lying down, like the spokes of a wheel, with their feet to the fire.

A good hut may readily be constructed on suitable ground or a hill-side by excavating and covering with a roof; but if timber is convenient it is better to build a log hut, covering it with bark, reed mast, sea-weed, &c.

In building a hut four poles are planted in the ground where the corners are to rest. The logs are then piled one above the other against those poles, being notched where they cross so as to bring their sides together.

PLATE VII.

Bivouac.



a a a a..Double sentries. *b b*..Outposts. *c*..Reserve of outpost. *d*..Main body. *e*..Kitchen. *f*..Company officers. *g*..Field officers' headquarters. *h*..Stores, &c. *i*..The guns. *k*..Guns' crews. *l*..Battery officers. *m*..Rear guard.

After the walls are completed doors and windows are cut, a chimney of clay, stone, &c., made, and the roof put on.

Bark taken in long strips makes good roofing or sides.

The roof should have a pitch of at least 45 degrees; cracks should be filled with moss, grass, mud, &c.

Waxed or oiled paper or thin white cloth make good substitutes for window-panes.

CANTONMENTS.

Cantonments are the inhabited places which troops occupy for shelter when not put into barracks.

The brigade commander indicates the place where the command shall assemble in case of alarm. It should generally be outside the cantonment; the egress from it should be free; the retreat upon the other positions secure, and roads leading to it on the side of the enemy obstructed.

Near the enemy, companies or platoons should be collected, as much as possible, in the same houses. If companies must be separated, they should be divided by platoons or squads. All take arms at daybreak.

Troops cantoned in the presence of the enemy should be covered by advance guards and by natural or artificial obstacles. Cantonments taken during a cessation of hostilities should be established in rear of a line of defense and in front of the point on which the troops would concentrate to receive an attack. The brigade commander assigns the limits of their cantonments to the battalion commanders and the battalion commanders to the company commanders.

The position for each battalion in case of attack should be carefully indicated by the brigade commander.

Cantonments should, if possible, be established behind a river for the sake of greater security against attack.

Artillery should be placed near the roads so as to be

able to move rapidly whenever needed—it should be covered by infantry.

Communications between the different places of assembly should be free. With this object, bridges should be repaired, roads improved, and newly opened if necessary. If a stream passes through the cantonment it must be bridged.

Where the cantonments are not covered with an unfordable river it is well to break up roads by which the enemy can arrive and to construct abatis and field-works in the most accessible places.

The following points should be borne in mind:

Companies of the same battalion should be kept together.

Men of the same company should be lodged together in platoons, if possible; if not, half platoons, a non-commissioned officer being sent with each subdivision.

The commander of a battalion and his staff should be placed as nearly as possible in the center of his battalion.

The company officers should be lodged in the same house with the men or very near them.

The music should be near headquarters.

Near the rallying place there should always be the police guard.

The company commanders in advance should mark with chalk upon the doors of houses and barns the company letter and the number of men each will contain.*

Distribution of lodging should commence on the right of the village looking towards the enemy; that is to say, the first company should be placed on the right, and so on.

The same rule should be followed with several battalions all in the same village or town; that is, the first battalion on the right.

*In quartering men in houses the following rule, based upon sanitary principles, should be followed: Houses 15 feet wide, one man to every yard of length; over 15 and less than 25 feet, two men to every yard; and if 25 feet or more, 3 men to every yard of length.

CHAPTER VII.

SMALL-ARM PRACTICE.

Theory of Practice—Cleaning and Handling of Piece—Mountings and Stock—Order of Exercises—Aiming—Remarks on Firing—Lee Bolt System—Firing—Estimating Distances—Pistol Practice.

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Chapter VII.

SMALL-ARM PRACTICE.

The importance of small-arm practice cannot be overestimated. Other things being equal, that force in an engagement will succeed whose men are the most skilled in the use of their weapons.

The Army long since realized the importance of this, and has given the matter such attention that from amateurs they have produced a body of superior marksmen.

An incentive was required to bring this to pass, and this was done by instituting a series of competitive rifle matches. Each year these matches are held at the various military divisions and departments, and medals are awarded the successful competitors. The best shots are then organized into a rifle team, who compete each year at Creedmore for the various medals and prizes.

Both the Navy and Marine Corps should follow the same course. There is no reason why both should not be represented at Creedmore; but before this can be done a complete system of instruction in the theory and practice of small-arms must be instituted aboard every ship in commission.

It is to be hoped that the Department will see fit to issue at an early day medals (gold, silver, and bronze) to be distributed to successful marksmen.

Target practice should be held ashore when possible: one practice ashore at known distances, where individual shots can be seen and errors corrected, would be worth a half dozen of the ordinary practices held aboard ship. Of course this cannot always be done, but it should be required when practicable.

After the first practice ashore (100 yards range) the men of each ship should be divided into three classes.

The *first class* includes those who make 70 per cent. or more; the *second class* more than 50 per cent. and less than 70 per cent.; and the *third class* 50 per cent. or less.

The first class should then be allowed to fire at 300 yards and the second class at 200 yards. All those of the first class who make less than 50 per cent. should be placed in the second class, and those in the second class who make more than 50 per cent. should be advanced to the first class.

As soon as any in the third class make 70 per cent. or more they should be advanced one class.

At the end of the year, or the time established for the competitive practices, those men who have made 70 per cent. or more at 300 and 600 yards should be classed as marksmen, and as an indication of such they should be permitted to wear a white button with a black circle in the center on each side of the shirt or coat collar.

Each year the various squadrons should hold a competitive rifle match open to all marksmen. The best shot should receive a squadron medal of silver and the second best one of bronze.

The scores made at these matches should be forwarded to the Department, and the best marksman in the Navy (whether officer, sailor, or marine) should be given the Department gold medal and the second best a silver one.

Officers should encourage the men to organize teams to compete with those of other ships, and should get up purses for that purpose.

Good shots should be granted indulgences, such as extra liberty, &c.

A very excellent and important feature of target practice is the aiming drill, which should be frequently practiced. For instruction each company should be divided into two or more squads, and the construction, care, and

preservation of the piece, the theory of the motion of bullets, and the preliminary drills in pointing, aiming, and pulling the trigger carefully explained to them.

It should be impressed upon each man that the acquirement of the requisite skill to fire accurately is one of his most important duties; that his safety and the safety of his companions may depend upon his ability to deliver his fire with effect, and the greatest proficiency in the manual of arms cannot atone for a want of dexterity in this particular; that a want of previous knowledge of the use of arms or a fancied unsteadiness of nerves are not causes for discouragement, for it is a fact well established by experience that any man who has not defective vision can by perseverance become a fair marksman.

It generally happens that those who have had little or no previous practice in firing become in a limited time better shots than those who have been somewhat accustomed to the use of the rifle, as they have no bad habits to unlearn.

For theoretical instruction each company should be divided into as many squads as there are officers, and thoroughly instructed.

On shore every man should be required to clean out the barrel of his piece as frequently as possible; never allow it to be put away dirty, as *one night's rusting will do it more harm than a year's use.*

THEORY OF PRACTICE.

The *line of fire* is the axis of the bore prolonged. The *line of sight* is the right line from the eye to the object to be hit, passing through the front and rear sights. The *natural line of sight* is the right line through the lowest notch of the rear sight and the top of the front sight.

An object is at *point blank* distance when it can be hit by aiming directly at it along the natural line of sight.

To hit an object within the *point blank* the piece is aimed below it.

To hit an object beyond the *point blank* the muzzle has to be raised, which is effected by elevating the notch on the rear sight along a vertical leaf, on which are graduated distances; by this means artificial *point blanks* are established, the piece being aimed as when at *point blank*.

Men should be instructed when not certain of their distance in the field to fire under rather than over the correct one, so as to form an opinion of the distance by observing the dust when thrown up by the bullet's striking the ground.

They should also be cautioned that a side wind will carry the bullet in the direction in which it is blowing, while a front wind, by reducing the speed of the bullet, diminishes the range, a rear wind having a contrary effect; that this is to be guarded against by aiming to one side or the other or above or below, the proper allowance being determined by experience. When the sun is shining upon one side it lightens up that side of the front sight and the opposite side of the notch of the back sight. In aiming, one is apt to take these brilliant spots for the real centers of the sights, and consequently to shoot toward the side away from the sun.

Recoil causes the man to turn to the side from which he fires, and produces deviation in that direction. It is supported by pressing the butt firmly against the shoulder with the right hand, the left hand supporting the weight of the rifle, and varies with the position of the rifle relative to the horizontal, being a maximum when the shot is fired vertically upward. The shock of the recoil against the shoulder is diminished by the bend in the stock, serving to decompose the force into two components, one acting through the stock against the shoulder, the other in the direction of the axis of the barrel, tending to raise it. Whatever lessens the recoil theoretically increases the range. The recoil is only 95 pounds for the Remington rifle (70 grains powder and bullet of

450 grains), while in the Springfield rifle, caliber .45, it is 174 pounds.

When the bullet reaches the muzzle of the rifle it will revolve about its axis nearly 800 times in a second, and a point on its exterior side surface will have an axial velocity of about 90 feet per second. This, in connection with the resistance of the air, produces a lateral drifting of the bullet in the direction in which the grooves have a turn. This is known as drift, and is greater in the descending than in the ascending branch of the trajectory. It increases as the diameter of the bullet, the angle of fire, the velocity of rotation, and the range increase, and as the velocity of translation decreases. The drift in the Springfield rifle (caliber .45, 70 grains powder) at 500 yards is 2 feet.

A very frequent cause of inaccuracy of fire is the incorrect graduation of the rear sight. Of course, if the elevations corresponding to certain ranges are not accurately marked the fire will be wild. In determining the graduation for any particular rifle, avoid all proportions and make a series of experiments with the greatest care. With a properly made arm and cartridge, and the elevating sight accurately graduated, any one can, by care and practice, become a good marksman.

A serious cause of inaccuracy, originating with the firer, is the faulty position that he gives to the musket in firing by inclining to the right or left, which tends to carry the bullet to the side to which the rifle is inclined, and to diminish the range. When firing at long ranges a trifling inclination to the right or left will throw the bullet very wide of the target.

To prevent inaccuracies while aiming, in addition to keeping the sight vertical, the firer should observe the following: The eye should glance from the sights to the target, being constantly on the target.

If the particular rifle carries higher or lower than the

average, it must be remedied by aiming with a fine or a coarse sight. In aiming *raise* the rifle. Upward motion acts against gravity, and has a tendency to prevent any lateral motion of the muzzle.

Hold the butt firmly against the shoulder, and do not turn the head away at the instant of pulling the trigger. Fire low rather than too high.

After firing a few shots on a dry, hot day the bullets gradually fall lower and lower, in consequence of the fouling of the barrel. The barrel should be kept clean and, as far as possible, not overheated.

The condition of the atmosphere noticeably affects the course of the bullet. The more moisture there is in the air the less the elevation required. Warm air offers less resistance to the bullet than does cold air. A fall of 20 degrees in temperature will cause the bullet to lower 10 or 11 inches at 300 yards range. In firing over water the elevation must be increased, in consequence of the lower temperature of the air over the water. In ascending a mountain the air becomes more and more rare, and consequently the resistance to the bullet is less on the mountain than at its base. Mirage, an optical illusion occurring in level districts on very warm days, causes the target to apparently raise in the air and become distorted in shape. This materially affects such objects as are near the ground and engenders a tendency to shoot too high.

When it is necessary to fire at night, when the sights cannot be distinctly seen, a dampened lucifer match should be rubbed on the top of the front sight and on the bottom of the notch of the rear sight.

CLEANING AND HANDLING THE PIECE.

In order that the rifle may give the best results, representing its highest state of efficiency, the barrel must be preserved perfectly straight, and to insure this care must be taken that it does not receive blows or falls,

by which it may become indented or bent; that the bore is free from dirt, lead, or rust, which would derange the flight of the bullet; that no gritty substance finds its way into the chamber on the cartridge, or otherwise, as this would mar the surface and cause the cartridge-case to stick by being forced by the explosion into the small cavities formed; that the lock and breech-closing parts are kept clean, free from rust, and well oiled, that the action of the former may not be impeded, and the tendency of the latter to stick and open hard may be obviated.

TO CLEAN THE BARREL.

Materials.—*Clean cotton rags, tow*, clean water, warm, if it can be had.

Implements.—*The rifle appendages.*

The men will be encouraged to procure and use a wooden wiping-stick in order to avoid the danger of injuring the grooves of the bore by the steel ramrod.

The bore will be cleaned as soon as possible after firing, as the fouling is then more easily removed. For this purpose place a piece of cotton rag 2 inches square, wet, with warm water, if possible, over the muzzle; press the end of the wiping-rod into the muzzle, forcing the rag along with it; move it up and down throughout the entire length of the barrel; change the rags until they are no longer soiled; dry the barrel by wiping it out with dry rags and afterwards with a rag slightly oiled, or clean tow may be used wrapped around the notched end of the wiping-stick in place of the rags.

When this cannot be had, draw a narrow wet rag through the slit in the end of the ramrod, being careful that it covers the head all round, pass it into the muzzle, and proceed as with the wiping-rod. Should the ramrod stick fast in the bore no extreme effort will be made to remove it, as there is great danger of injuring the bore

by so doing, but it should at once be taken to the armorer.

By using this mode of cleaning the liability of water to enter between the stock and the barrel is lessened, and the necessity of removing the barrel, which is objectionable, is obviated. Should the stock become wet under the barrel, remove the latter; dry and oil both before reassembling them.

Clean out the chamber and well of the receiver with a rag on a short stick, and the bearing surface on the breech-screw and firing-pin, and wipe them with a rag slightly oiled.

As the barrels of all arms now issued are first browned, the use of sand-paper, emery, tripoli, &c., for cleaning them is strictly prohibited.

MOUNTINGS AND STOCK.

The mountings will be cleaned by rubbing them with an oiled rag. If the browned parts become rusty the rust will be rubbed down with a wire scratch-brush and then oiled.

Oil the stock with linseed oil, let it stand for a few hours, and rub it down with a woolen rag; by repeating this operation a number of times a fine polish will be produced, which does not crack and will protect the wood perfectly from moisture.

To keep the rain from getting under the stock, fill up the interstice between the stock and barrel with beeswax.

It must be remembered that the presence of sand, dirt, or other such foreign substances in the bore near the muzzle renders the barrel liable to burst if fired in this condition; men will therefore be careful to preclude the possibility of such substances finding their way there by keeping the muzzle closed with a tompion, cork, or rag, being specially mindful to remove them before firing the

rifle; they will make it a point first to wipe out the bore before firing, and the danger just referred to need not be apprehended, and better shooting will be sure to follow.

HANDLING THE RIFLE.

The men will be instructed to handle their rifles at all times gently, and under no circumstances to use them for any other purpose than that for which they were constructed. It will be borne in mind that the rifle-barrel near the muzzle is thin and may be easily indented or bent; the men will therefore be careful, in stacking arms and in placing them in the gun-racks, that no undue strain is brought upon the barrel. Adopt the rule of laying the rifle down rather than standing it on the butt, a position in which it is liable to fall and thereby receive injury. In coming to order arms the butt will not be brought to the ground roughly; all violent shocks, which are injurious to the parts, loosening the screws, &c., will be carefully avoided. The hammer, as a rule, will rest on the firing-pin, and should never be left at full cock. If, after cocking, the intention of firing shall be deferred, bring the hammer to the half-cock notch. Care will be taken that the front sight is not bruised, marred, or in any way injured, and that the sight leaf is close down on the base.

ORDER OF EXERCISES.

To fire the rifle accurately, men must combine four distinct things in a single action; that is, they must take the best position for holding the rifle, aim it accurately, hold it steadily, and pull the trigger without deranging the aim.

AIMING.

By *fine sight* is meant that position of the sights in which just the top of the front sight is seen through the

notch of the rear sight; and *full sight* indicates that all of the wedge-shaped part of the front sight is visible. Beginners are apt to use the latter, and must be careful to guard against it.

REMARKS ON FIRING.

After firing a cartridge always withdraw the empty case at once, and never allow it to remain in the chamber, as it is apt to corrode and stick fast if left there.

LEE SYSTEM.

The Lee bolt system (not referring to its magazine attachments) has fewer parts than any other in use, there being in all (1) receiver, (2) bolt, (3) firing-pin, (4) main-spring, (5) thumb-piece, (6) key-sleeve, (7) extractor, (8) sear, (9) trigger, (10) sear-spring, (11) trigger-guard, (12) extractor-spring, together with tang and guard screws and four pins.

The arm can be carried while loaded with perfect safety by withdrawing the thumb-piece to the half-cock notch, which operation fixes the bolt firmly to its closed position and locks the firing-pin backward clear from the cartridge until the thumb-piece is drawn back to full cock, when the piece may be fired.

The ease and rapidity with which this arm can be dismounted and assembled is noticeable. By inserting the point of a knife or screw-driver into the notch cut on the extractor-spring next the shoulder of the bolt-handle the extractor spring is pressed forward, releasing the hook on its under side from the pin with which it engages when in place. This releases the extractor-spring and the extractor and the bolt may then be drawn out of the receiver. By pressing forward and downward on the lug of the key-sleeve it is released from the bolt, together with the thumb-piece, the firing-pin, and the main-spring. To assemble the bolt and its parts, the thumb-piece, firing-pin, and main-spring are placed in

their proper position, and the lug of the key-sleeve is pressed upward into its locking-notch in the bolt. Returning the assembled bolt upon its place in the receiver, lay the extractor in its notch on the bolt and place the extractor-spring in position, giving the bolt a sharp push forward, and the hook will engage itself on the pin on the bolt-rib created for the purpose, and the arm is ready for use.

To change this single-fire breech-loader to a magazine arm consists simply in introducing through a slot or opening cut through the stock and receiver, forward of the trigger-guard, a magazine made to contain five (more or less) cartridges. The magazine is held in place by the magazine-catch, which engages into a notch or depression in the rear of the magazine, and can be released in a moment by an upward pressure on the magazine-catch at its lower end, where it projects downward into the trigger-guard.

It is intended that two or more magazines shall be furnished with each arm, which are to be carried, charged, in the cartridge-box or pocket. The magazine can be charged with cartridges (five is the number recommended that they shall contain), in less than five seconds. It is quite practicable that all ammunition issued be contained in these magazines, which may be made, if required, very light, of skeleton form, and of such cheap construction as will admit in action of their being dropped and left on the field, as are the shells of expended cartridges. The arm can be used as a single loader until the need of rapid firing becomes apparent when, at the word of command the charged magazines may be inserted and used. The least intelligent can obey this order without looking at the arm. While removing or inserting the magazine, the arm should be held at the grip by the right hand in a vertical position.

FIRING.

Before the men are permitted to fire with ball they should be practiced to fire blank cartridges with the view to give them steadiness, and accustom them to the recoil which follows the explosion of the powder.

Navy targets are of the following sizes:*

The size of any single target will be 6 feet in length by 2 in breadth, constructed of a single sheet of boiler-plate iron three-eighths of an inch thick, having squares of 6 inches cut on its face to facilitate marking off the hits on diagrams provided for the purpose, and also to serve as guides in painting the subdivisions. The target is to be painted white, while the "bull's-eye" and the lines describing the divisions (which are not to exceed half an inch in width) are to be black. The other classes of targets are made up by the union of two or more single targets.

With the heavier machine guns, such for instance as the Hotchkiss revolving cannon, the regulation great gun target, or a target such as the great guns would be fired at, should be used for target practice, and the return of such practice will be made on the blanks furnished for great guns, and following the same form. The range for firing should not exceed 1,000 yards, and until the men become reasonably expert, should be rather less than 500.

With the other machine guns, firing small-arm ammunition, the boiler-plate target can be used, the class of target, the distance at which used, the numerical value of the hits, the form of the report, &c., being the same as for the rifle. Instead of aiming for each individual shot, a feed case of cartridges will be fired on a single aim. Even if the gun is being laid by the "pointing lever," a full feed case should be fired before the crank is stopped.

In ship practice with the rifle the target should preferably be of the dimensions of the single target above given; and, if danger is apprehended from the splash of the bul-

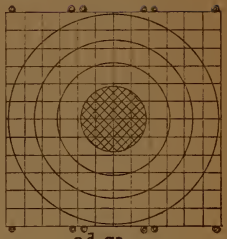
* Ordnance Instructions, U. S. Navy.

PLATE IX.

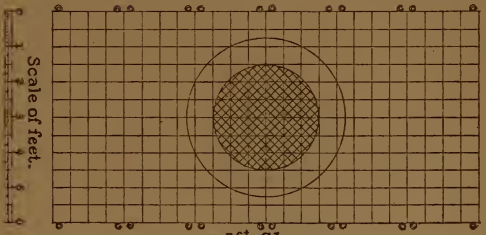
NAVY TARGETS.

Single.

3d Class.



2d Class.



1st Class.

let, it can be made of wood or other easily perforated material.

Pistol and revolver practice should be at the single target and at distances of 15, 25, or 35 yards.

The classification of targets and the distances at which used are as follows:

Single target, to be used for ship practice with the rifle; for pistol and revolver practice at distances up to and including 35 yards. Target 2 by 6 feet. Bull's-eye, circular, 8 inches in diameter; center circular, 24 inches in diameter; outer, all of target beyond "center."

Third class, to be used for rifle and small caliber machine guns up to and including 300 yards. Target 4 by 6 feet. Bull's-eye, circular, 8 inches in diameter; center, circular, 26 inches in diameter; inner, circular, 46 inches in diameter; outer, all of target beyond "inner."

Second class, to be used for rifle and small caliber machine guns at all distances over 300 to and including 600 yards. Target 6 by 6 feet. Bull's-eye, circular, 22 inches in diameter; center circular, 38 inches in diameter; inner circular, 54 inches in diameter; outer circular, 70 inches in diameter.

The new army targets are as follows: *

Target A, short range target, for distances from 100 to 300 yards, inclusive, is a rectangle 4 feet wide and 6 feet high. The bull's-eye is an ellipse 10 inches high and 8 inches wide. The shapes of the other divisions of the target should be similar to the bull's-eye, and for the center or next division should be 24 inches wide and 30 inches high. The next division, called the inner, 40 inches wide and 50 inches high.

Target B, mid-range target, used for 500 or 600 yards, is a square 6 by 6 feet. Dimension of bull's-eye, 18 by 24 inches; of the center, 36 by 48 inches; of the inner, 54 by 72 inches.

* These targets have proven very satisfactory, and are superior to the Wingate targets used in the Navy.

Target C, long-range target, from 600 to 1,000 yards, is a rectangle 12 by 6 feet; size of bull's-eye, 45 by 72 inches; of center, 51 by 72 inches; the inner a square 6 by 6 feet.

An intelligent petty officer and one man should be placed in a pit in front of and about 20 feet to the left of the target.

The petty officer should be furnished with a red flag and a tin or pasteboard disk, black on one side and white on the other; the disk should be attached to a rod about 2 feet long.

If the target is of iron the assistant should have a pot of black and one of white paint; if of wood or canvas, he should be provided with paste and two boxes, one containing white, the other black patches.

Whenever a shot strikes, the petty officer waves his flag as a signal to cease firing. He then proceeds to the target and places the center of the disk over the shot hole, exposing the black side or white side of the disk, according as the ball strikes in the white or black parts of the target. The shot being indicated, the assistant paints it out or covers it with a patch of the proper color.

The signal *commence firing* is sounded before beginning to fire; also on resuming the fire after each hit.

To avoid the possibility of accidents the signal *cease firing* should be given, and until it is sounded, markers should not leave their pit under any circumstances.

In scoring, a bull's-eye counts 5, a center 4, an inner 3, and an outer 2.

The companies should be practiced in firing by companies, by platoons, by rank, and file.

After a fair degree of proficiency has been reached in a company, its members should be exercised in firing as skirmishers at unknown distances. For this purpose targets should be arranged at various distances and one assigned to each man, the number of targets being equal

to the number of men. These targets can readily be made by stretching paper or canvas over a wooden frame.

At the command "commence firing" the skirmishers should advance slowly toward their targets, each being required to fire in any position desired the same number of shots. A stake about 100 yards in front of each target should be driven in the ground, and each man cautioned not to advance beyond it.

PISTOL PRACTICE.

Pistol shooting, owing to the unsteady support the hand gives the weapon, should always be according to the "snap" method; that is, the eye is not taken from the object to look along the pistol, nor should any effort be made to align the pistol between the eye and object. The best results are obtained when there is no pause between quickly projecting the pistol and firing; no attempt being made to look along the barrel to see if it points at the object. The pistol bullet must be directed instinctively, as is the arrow from the bow or the stone from the sling.

By the following method great skill is usually soon attained in pistol firing at an object in front, rear, or on either side; when moving or still, when both the firer and object are moving; when firing at an object only seen for a moment, the eye taking only its direction and speed; or when firing with two pistols at two objects in divergent directions and at different distances.

The first principle to observe in rifle and especially in pistol firing, is to extend the thumb when holding the handle. It must be extended as nearly as possible in the direction of the bore of the weapon, and not grasp the handle. This extension brings the thumb along the left side of the pistol hammer, and the inner end of the handle should rest over the little finger. This method of

holding gives the necessary and all possible support to the weapon.

Experience has shown that the extension of the thumb along the top of the stock in the prolongation of the fore-arm enables the weapon, whether rifle or pistol, to be not only quickly aligned on the object, but, after a little practice, to be thrown into accurate alignment with it from any position, and fired without looking at the weapon at all.

For small and medium sized hands the handle of the Colt pistol is most acceptable; the Smith & Wesson suits large hands best. But neither of these handles fits the hand as it would be made to do if manufacturers knew how it had to be used to the best advantage.

There is but one way for the military to hold the loaded pistol—that is "raised."

Snap firing should begin at black pasters stuck about on a canvass target five paces distant.

In firing, the eye must see only the object, and the pistol must be projected at it and fired with the same motion and rapidity that a missile is thrown from the hand, from the same raised position of the aim. The bullet should leave the pistol just as the thrown missile does the hand, the object at which the projectile is thrown being alone noticed.

As the firer instinctively feels the way to throw the bullet (for he must not even glance at his pistol) and acquires skill, the distance from the object should be increased 2 or 3 paces.

At 10 or 12 paces he should, after glancing intently at the object, look away and then fire; with the back to the target, standing in a position of "guard" look over the right shoulder and fire; occasionally fire across the body, left side being toward the target. This first practice up to 15 yards should be with reloaded shells, 10 and 12 grains of powder, and the round dropped ball, .44 caliber.

So soon as good firing is made at 15 yards, instruction after the same manner, at a 4-inch bull's-eye, with 16 to 20 grains of powder and the 230-grain bullet, should be continued up to 50 yards, increasing the distances of the firing points by 5 paces at a time. Beyond 50 yards the regulation cartridge and bull's-eye should be used up to 100 yards.

The foregoing gives at least an insight into, if it is not a description of, the best method of revolver firing. No attempt is made to explain its reasonableness, but those who have pursued the aiming method, and have doubts about the snap method, should give it a trial.

At first rather wild shooting must be expected, but if the practice is begun with reduced charges, the surprise will probably be at the rapid improvement and the increased interest, and the great and immediate skill attained.

ESTIMATING DISTANCES.

Estimating distances should take place under different conditions of the atmosphere, cloudy, foggy, &c., and, if the locality permits, squads should be drilled on ground the outline of which is diversified by hills, ravines, &c.

Men should be required to pace a known distance, carefully counting the number of steps taken. A little practice will soon enable them to pace short distances with considerable accuracy.

As no two men have exactly the same clearness and strength of vision, each man must know from actual trial exactly what are his own powers, as a standard for future estimation of distances.

If the observer's back be turned toward the sun, the observations made in winter when the air is dry and clear, or else just before or after a rain, if the ground be level and of a uniform tint, or if it rise toward the object. the distance will appear less than it really is. This is also the case in judging distances over earth-works.

In all the directions that the officers in action may give to their troops, they will be careful, in determining the height of sight to be used, to take into consideration the effect of the temperature, wind, rain, and in general all causes which may modify the trajectory, aiming to fire low rather than over, in order to get the benefit of ricochet shots.

When the troops charged with the defenses of any position have the necessary time beforehand, the commander will carefully study the neighboring ground before the enemy appears, and will cause exact measurements to be made of the distances to the most important points.

Estimating distances by sound cannot be advantageously followed if the men firing are so much concealed that the smoke is not quickly visible after the discharge. It affords, however, the best method of obtaining the distance of an enemy at night, when the position is often only marked by the flash from his rifle.

Under conditions favorable to observations long practice enables an observer to estimate immediately and quite closely the position of an object within the distance of 500 yards. Beyond this limit the variable conditions of the atmosphere, as well as the form and nature of the ground, lead the most practicable observer into considerable error.

A knowledge of the parts of objects visible at certain distances is necessary. But as this will vary with the power of the eye, each must, by comparison and reflection, establish a standard of his own.

For men of ordinary eyesight, and under ordinary conditions of air and light, the following general rules are applicable:

APPEARANCE OF MEN.

At 30 yards the white of a man's eyes is plainly seen, and the eyes themselves up to 80 yards.

At 100 yards all the parts of the body are distinctly

seen, slight movements are perceptible, and the minute details of the uniform can be distinguished.

At 150 yards the buttons on the blouse can still be separately distinguished.

At 200 yards the outlines of the face are confused, and the rows of buttons look like stripes.

At 300 yards the buttons are no longer visible.

At 400 yards the face is a mere dot, but all movements of the legs and arms are still distinct.

At 600 yards details can no longer be distinguished though the files of a squad, if the light is strong, can be counted.

At 800 yards the men in a squad cannot always be counted nor their individual movements distinguished.

At 1,000 yards a line of men simply resembles a broad belt; the direction of their march can, however, be readily determined.

At 1,200 yards infantry can be distinguished from cavalry.

At 1,700 yards masses of troops can be recognized.

At 2,000 yards a mounted man appears as a mere speck or spot.

APPEARANCE OF OBJECTS.

At 250 yards roof tiles can be counted.

At 500 yards window panes can be counted.

At two-thirds mile single posts can be seen.

At 1¼ miles trunks of large trees are discernible.

At 2 to 2½ miles chimneys of a light color are visible, and the windows in a house can be counted.

At 5 to 7 miles wind mills can be distinguished.

At 10 to 12 miles church spires and towers can be seen.

When the light shines directly on objects, where they are light colored, or when they are seen against a light background, their details are more clearly visible, and they consequently appear nearer than they really are.

Under the reverse conditions the distance will appear greater, or if the eye follow the line of a canal or rectilinear road, and more especially if the road is bordered by walls or trees.

The tendency, in looking from an elevation down to a lower level, is to estimate short of the true distance, and in looking upwards to a height it is just the reverse.

On a wide plain of uniform color, such as water, snow, cornfields, meadows, &c., if the eye be arrested by no intermediate points, the estimate will be generally too short.

To estimate distance by a bursting shell or flash of a gun, multiply the number of seconds that elapse between the flash and the report by 370 (the number of yards sound travels in one second), the product will be the distance in yards. To find the distance in miles divide this product by 1,760 (the number of yards in 1 mile).

An impassable distance may be determined by firing a bullet at a well-defined mark at the further end of the distance, with the sight adjusted to the estimated distance, and noticing whether the bullet falls short or passes beyond the mark.

Every man should know his height, the full stretch of his extended arms, the exact height of his eyes above the ground when standing and when kneeling, the length of his foot, the width of his fingers, and the exact amount contained in his cup or canteen.

CHAPTER VIII.

LAW.

General Court-Martial—Form of Precept—Letters of Appointment—Judge-Advocate—Summons of Witnesses—Order of Procedure—Summary Court-Martial—Form of Precept—Specification—Order of Procedure—Courts of Inquiry—Oath to Clerk—Oath to Interpreter—Military Jurisdiction—Military Necessity—Retaliation—Deserters—Prisoners of War—Hostages—Booty on the Battlefield—Partisans—Scouts—Armed Prowlers—War Rebels—Safe Conduct—Spies—War Traitors—Captured Messengers—Abuse of Flag of Truce—Exchange of Prisoners—Flags of Truce—Armistice—Capitulation.

Chapter VIII.

LAW.

GENERAL COURT-MARTIAL.

(For appointment and composition of the court, oaths, punishments, &c., see Appendix I, articles 38 to 54, inclusive.)

Form of precept.

——— ———,
———————.

To ——— ———,
———————,
——— ———.

A general court-martial is hereby ordered to convene ——— ——— or as soon thereafter as practicable, for the trial of ——— ———, and of such other persons as may be legally brought before it.

The court is to be composed of the following members, any five of whom are empowered to act, viz:

_____

_____

and of ——— ——— as judge-advocate. No other officers can be detailed without manifest injury to the service.

——— ———,
——— ———.

Letter of appointment to judge-advocate or members.

——— ———,
——— ———.

To ——— ———,
——— ———.

SIR: A naval general court-martial, of which you are appointed judge-advocate (or member), has been ordered to convene ——— ———, at which time and place you will appear and report yourself to the presiding officer of the court.

Very respectfully,

——— ———,
——— ———.

Summons of witness.

——— ———,

——— ———.

You are hereby summoned to appear before a naval general court-martial which will convene ——— ———, to testify in the case of ——— ———.

——— ———,

Judge-Advocate.

To ——— ———,

——— ———.

Order of procedure.

[NOTE.—The sections refer to "Orders, Regulations, and Instructions for the Administration of Law and Justice in the U. S. Navy."]

(1) Court meets.

(2) Accused introduced. (Sec. 184.)

(3) Precept read. (Sec. 184.)

(4) Warrant of judge-advocate read. (Sec. 184.)

(5) Opportunity offered accused to object to members. (Sec. 187.)

(6) Judge-advocate sworn by president of court. (Sec. 193.)

(7) Court sworn by judge-advocate. (Sec. 193.)

(8) Does accused desire counsel? (Sec. 199.)

(9) Charges and specifications read. (Sec. 203.)

(10) Plea entered. (Sec. 204.)

(11) Witness for prosecution introduced. (Sec. 211.)

(12) Witness sworn by presiding officer. (Sec. 213.)

(13) Charges and specifications read (or not). (Sec. 217.)

(14) Examination of witness: (1) by party producing him; (2) by opposite party; (3) by party producing him (if new matter has been brought out by the opposite party); (4) by court. (Sec. 224.)

(15) Witness's testimony read to him. (Sec. 221.)

(16) Has accused any witnesses to introduce? (If so, he examines them first, the judge-advocate re-examines them, and if new matter is elicited the accused likewise examines him, and lastly the court. (Sec. 226.)

(17) Has accused anything to offer in extenuation. (Sec. 227.)

(18) Finishing of trial. (Sec. 231.)

(19) Court closes and judge-advocate reads over proceedings, necessary. (Sec. 232.)

(20) Finding recorded. (Sec. 232–34.)

(21) Sentence recorded. (Sec. 235.)

(22) Signing of the record. (Sec. 255.)

(23) Recommendation for clemency (?) (Sec. 257.)

(24) Record forwarded to revising authority by the president of the court. (Sec. 258.)

(25) Revision (?). (Sec. 262.)

SUMMARY COURT-MARTIAL.

(For appointment and composition of the court, oaths, punishments, &c., see Appendix I, Articles 26 to 35, inclusive; see, also, Article 41.)

Form of precept.

——— ———,

——— ———.

SIR: A naval summary court-martial is hereby ordered to convene ——— ———, or as soon thereafter as practicable, for the trial of ——— ———, or of such persons as may be legally brought before it. The court will be composed of yourself as senior member, and of the following officers:

———— ————,

———— ————,

——— ——— will act as recorder.

——— ———,

——— ———.

To ——— ———,

Senior member of the court.

(*The orders to the other members of the court and to the recorder may be either written or verbal.*)

Specification.

The specification must be as brief as possible. It must contain all the offenses committed at the time for which the accused is to be tried, and it must be signed by the officer ordering the court. (Sec. 22.)

The recorder certifies on the original specification that a certified copy of it has been furnished the accused before the court met, and appends the original to the record. (Sec. 21.)

Order of procedure.

As nearly as possible the same as prescribed for general courts. (Sec. 23.)

(1) Court meets.
(2) Accused introduced.
(3) Order convening the court read.
(4) Opportunity offered accused to object to members. (Sec. 26.)
(5) Members sworn by recorder. (Sec. 27.)
(6) Recorder sworn by senior member. (Sec. 27.)
(7) Does accused desire counsel? (Sec. 30.)
(8) Specification read (accused not called upon to plead).
(9) Witness for prosecution called in.
(10) Witness sworn by senior member. (Sec. 33.)
(11) Specification read (or not) to witness.
(12) Testimony recorded (order of examination same as in general court).
(13) Testimony read to witness.
(14) Has accused any witnesses?
(15) Has the accused anything to offer in extenuation.
(16) Court cleared.
(17) Finding and sentence fully recorded and signed by members and recorder.
(18) Record transmitted to revising officer.
(19) Revision (?).

COURTS OF INQUIRY.

(For appointment and composition of the court, oaths, &c., see Appendix I, Articles 55 to 60, inclusive.)

(1) Court meets.
(2) Court cleared to digest orders and instructions. (Sec. 62.)
(3) Accused admitted if he desires. (Sec. 74.)
(4) Members sworn by judge-advocate (Sec. 60.)
(5) Judge-advocate sworn by president. (Sec. 60.)
(6) Clerk or reporter (if there be one) sworn by judge-advocate.

Oath to clerk or reporter.

"You, A. B., swear (or affirm) faithfully to perform the duty of clerk or reporter in aiding the judge-advocate to take down and record the proceedings of the court, either in short-hand or ordinary manuscript." (Sec. 69.)

7) Interpreter (if there be one) sworn by judge-advocate.

Oath to interpreter.

"You, A. B., swear faithfully and truly to interpret or translate in all cases in which you shall be required to do between the United States and the accused." (Sec. 70.)

(8) Witnesses called in (one at a time). (Sec. 75.)

(9) Witness sworn by president of court. (Sec. 75.)

(10) Witness examined in the usual order, the same as in courts-martial. (Sec. 80.)

(11) Accused asked if he has any witnesses. (Sec. 79.)

(12) Court cleared. (Sec. 86.)

(13) Finding recorded. (Sec. 87.)

(14) Proceedings signed by president of the court and the judge-advocate only. (Sec. 88.)

(15) Proceedings transmitted to revising authority. (Sec. 88.)

(16) Revision (?). (Sec. 89.)

MARTIAL LAW—MILITARY JURISDICTION—MILITARY NECESSITY—RETALIATION.

A place, district, or country occupied by an enemy stands, in consequence of the occupation, under the martial law of the invading or occupying army, whether any proclamation declaring martial law or any public warning to the inhabitants has been issued or not. Martial law is the immediate and direct effect and consequence of occupation or conquest.

Martial law does not cease during the hostile occupation, except by special proclamation, ordered by the commander-in-chief, or by special mention in the treaty of peace concluding the war, when the occupation of a place or territory continues beyond the conclusion of peace as one of the conditions of the same.

Martial law in a hostile country consists in the suspension, by the occupying military authority, of the criminal and civil law, and of the domestic administration and government in the occupied place or territory, and in the substitution of military rule and force for the same, as well as in the dictation of general laws, as far

as military necessity requires this suspension, substitution, or dictation.

The commander of the forces may proclaim that the administration of all civil and penal law shall continue, either wholly or in part, as in times of peace, unless otherwise ordered by the military authority.

Martial law is simply military authority exercised in accordance with the laws and usages of war. Military oppression is not martial law: it is the abuse of the power which that law confers.

Martial law should be less stringent in places and countries fully occupied and fairly conquered. Much greater severity may be exercised in places or regions where actual hostilities exist or are expected, and must be prepared for. Its most complete sway is allowed—even in the commander's own country—when face to face with the enemy, because of the absolute necessities of the case and of the paramount duty to defend the country against invasion.

Martial law extends to property and to persons, whether they are subjects of the enemy or aliens to that Government.

Consuls, among American and European nations, are not diplomatic agents. Nevertheless, their offices and persons will be subjected to martial law in cases of urgent necessity only; their property and business are not exempted. Any delinquency they commit against the established military rule may be punished as in the case of any other inhabitant, and such punishment furnishes no reasonable ground for international complaint.

The functions of ambassadors, ministers, or other diplomatic agents, accredited by neutral powers to the hostile Government, cease, so far as regards the displaced Government; but the conquering or occupying power usually recognizes them as temporarily accredited to itself.

The law of war does not only disclaim all cruelty and bad faith concerning engagements concluded with the enemy during the war, but also the breaking of stipulations solemnly contracted by the belligerents in time of peace, and avowedly intended to remain in force in case of war between the contracting powers.

It disclaims all extortions and other transactions for individual gain, all acts of private revenge or connivance at such acts.

Offenses to the contrary shall be severely punished, and especially so if committed by officers.

Whenever feasible, martial law is carried out in cases of individual offenders by military courts, but sentences of death shall be executed only with the approval of the chief executive, *provided* the urgency of the case does not require a speedier execution, and then only with the approval of the chief commander.

War is not carried on by arms alone. It is lawful to starve the hostile belligerent armed or unarmed, so that it leads to the speedier subjection of the enemy.

When the commander of a besieged place expels the non-combatants, in order to lessen the number of those who consume his stock of provisions, it is lawful, though an extreme measure, to drive them back, so as to hasten on the surrender.

Commanders, whenever admissible, inform the enemy of their intention to bombard a place, so that the non-combatants, and especially the women and children, may be removed before the bombardment commences; but it is no infraction of the common law of war to omit thus to inform the enemy. Surprise may be a necessity.

Private citizens are no longer murdered, enslaved, or carried off to distant parts, and the inoffensive individual is as little disturbed in his private relations as the commander of the hostile troops can afford to grant in the overruling demands of a vigorous war.

In modern regular wars of the Europeans and their descendants in other portions of the globe, protection of the inoffensive citizen of the hostile country is the rule; privation and disturbance of private relations are the exceptions.

Retaliation will never be resorted to as a measure of mere revenge, but only as a means of protective retribution, and, moreover, cautiously and unavoidably; that is to say, retaliation shall only be resorted to after careful inquiry into the real occurrence and the character of the misdeeds that may demand retribution.

The more vigorously wars are pursued the better it is for humanity. Sharp wars are brief.

PUBLIC AND PRIVATE PROPERTY OF THE ENEMY—PROTECTION OF PERSONS, AND ESPECIALLY WOMEN; OF RELIGION, THE ARTS AND SCIENCES—PUNISHMENT OF CRIMES AGAINST THE INHABITANTS OF HOSTILE COUNTRIES.

A victorious army appropriates all public money, seizes all public movable property until further direction by its Government, and sequesters for its own benefit or that of its Government all the revenues of real property belonging to the hostile Government or nation. The title to such real property remains in abeyance during military occupation, and until the conquest is made complete.

It is no longer considered lawful—on the contrary it is held to be a serious breach of the law of war—to force the subjects of the enemy into the service of the victorious Government, except the latter should proclaim, after a fair and complete conquest of the hostile country or district, that it is resolved to keep the country, district, or place permanently as its own, and make it a portion of its own country.

As a general rule, the property belonging to churches, to hospitals, or other establishments of an exclusive

charitable character, to establishments of education, or foundations for the promotion of knowledge, whether public schools, universities, academies of learning, or observatories, museums of the fine arts, or of a scientific character—such property is not to be considered public property, but it may be taxed or used when the public service may require it.

Classical works of art, libraries, scientific collections, or precious instruments, such as astronomical telescopes, as well as hospitals, must be secured against all avoidable injury, even when they are contained in fortified places whilst besieged or bombarded.

If such works of art, libraries, collections, or instruments belonging to a hostile nation or government can be removed without injury, the ruler of the conquering state or nation may order them to be seized and removed for the benefit of the said nation. The ultimate ownership is to be settled by the ensuing treaty of peace.

In no case shall they be sold or given away, if captured by the armies of the United States, nor shall they ever be privately appropriated, or wantonly destroyed or injured.

The United States acknowledge and protect, in hostile countries occupied by them, religion and morality, strictly private property, the persons of the inhabitants, especially those of women, and the sacredness of domestic relations. Offenses to the contrary shall be rigorously punished.

This rule does not interfere with the right of the victorious invader to tax the people or their property, to levy forced loans, to billet soldiers, or to appropriate property, especially houses, land, boats or ships, and churches, for temporary and military uses.

Private property, unless forfeited by crimes or by offenses of the owner, can be seized only by way of military

necessity for the support or other benefit of the Army of the United States.

All wanton violence committed against persons in the invaded country, all destruction of property not commanded by the authorized officer, all robbery, all pillage or sacking, even after taking a place by main force, all rape, wounding, maiming, or killing of such inhabitants, are prohibited under the penalty of death or such other severe punishment as may seem adequate for the gravity of the offense.

A soldier, officer, or private, in the act of committing such violence and disobeying a superior ordering him to abstain from it, may be lawfully killed on the spot by such superior.

All captures and booty belong, according to the modern law of war, primarily to the government of the captor.

Prize-money, whether on sea or land, can now only be claimed under local law.

Neither officers nor soldiers are allowed to make use of their position or power in the hostile country for private gain, not even for commercial transactions otherwise legitimate.

Crimes punishable by all penal codes, such as arson, murder, maiming, assaults, highway robbery, theft, burglary, fraud, forgery, and rape, if committed by an American soldier in a hostile country against its inhabitants, are not only punishable as at home, but in all cases in which death is not inflicted the severer punishment shall be preferred.

DESERTERS, PRISONERS OF WAR, HOSTAGES, BOOTY ON THE BATTLE-FIELD.

Deserters from the American Army, having entered the service of the enemy, suffer death if they fall again into the hands of the United States, whether by capture or being delivered up to the American Army; and if a de-

serter from the enemy, having taken service in the Army of the United States, is captured by the enemy and punished by them with death or otherwise, it is not a breach against the law and usages of war requiring redress or retaliation.

All soldiers of whatever species of arms; all men who belong to the rising *en masse* of the hostile country; all those who are attached to the army for its efficiency and promote directly the object of the war, except such as are hereinafter provided for; all disabled men or officers on the field or elsewhere, if captured; all enemies who have thrown away their arms and asked for quarter, are prisoners of war, and as such exposed to the inconveniences as well as entitled to the privileges of a prisoner of war.

Citizens who accompany an army, for whatever purpose, such as sutlers, editors or reporters of journals, or contractors, if captured, may be made prisoners of war and be detained as such.

The monarch and members of the hostile reigning family, male or female, the chief and chief officers of the hostile government, its diplomatic agents, and all persons who are of particular and singular use and benefit to the hostile army or its government, are, if captured on belligerent grounds, and if unprovided with a safe-conduct granted by the captors' government, prisoners of war.

The enemy's chaplains, officers of the medical staff, apothecaries, hospital nurses and servants, if they fall into the hands of the American Army, are not prisoners of war, unless the commander has reasons to retain them. In this latter case, or if, at their own desire, they are allowed to remain with their captured companions, they are treated as prisoners of war, and may be exchanged if the commander sees fit.

A prisoner of war is subject to no punishment for being a public enemy, nor is any revenge wreaked upon him by

the intentional infliction of any suffering or disgrace, by cruel imprisonment, want of food, by mutilation, death, or any other barbarity.

So soon as a man is armed by a sovereign government and takes the soldier's oath of fidelity, he is a belligerent; his killing, wounding, or other war-like acts are no individual crimes or offenses.

It is against the usage of modern war to resolve, in hatred and revenge, to give no quarter. No body of troops has the right to declare that it will not give, and therefore will not expect, quarter; but a commander is permitted to direct his troops to give no quarter, in great straits, when his own salvation makes it impossible to cumber himself with prisoners.

Troops that give no quarter have no right to kill enemies already disabled on the ground, or prisoners captured by other troops.

All troops of the enemy known or discovered to give no quarter in general, or to any portion of the army, receive none.

The use of the enemy's national standard, flag, or other emblem of nationality, for the purpose of deceiving the enemy in battle, is an act of perfidy by which they lose all claim to the protection of the laws of war.

Unnecessary or revengeful destruction of life is not lawful.

Outposts, sentinels, or pickets are not to be fired upon, except to drive them in, or when a positive order, special or general, has been issued to that effect.

The use of poison in any manner, be it to poison wells, or food, or arms, is wholly excluded from modern warfare. He that uses it puts himself out of the pale of the law and usages of war.

Whoever intentionally inflicts additional wounds on an enemy already wholly disabled, or kills such an enemy, or who orders or encourages soldiers to do so, shall suffer

death if duly convicted, whether he belongs to the Army of the United States or is an enemy captured after having committed his misdeed.

Money and other valuables on the person of a prisoner, such as watches or jewelry, as well as extra clothing, are regarded by the American Army as the private property of the prisoner and the appropriation of such valuables or money is considered dishonorable, and is prohibited.

Nevertheless, if large sums are found upon the persons of prisoners, or in their possession, they shall be taken from them, and the surplus, after providing for their own support, appropriated for the use of the Army, under the direction of the commander, unless otherwise ordered by the Government. Nor can prisoners claim, as private property, large sums found and captured in their train, although they had been placed in the private luggage of the prisoners.

All officers, when captured, must surrender their side arms to their captor. They may be restored to the prisoner in marked cases, by the commander, to signalize admiration of his distinguished bravery, or approbation of his humane treatment of prisoners before his capture. The captured officer to whom they may be restored cannot wear them during captivity.

A prisoner of war, being a public enemy, is the prisoner of the Government and not of the captor. No ransom can be paid by a prisoner of war to his individual captor, or to any officer in command. The Government alone releases captives, according to rules prescribed by itself.

Prisoners of war are subject to confinement or imprisonment, such as may be deemed necessary on account of safety, but they are to be subjected to no other intentional suffering or indignity. The confinement and mode of treating a prisoner may be varied during his captivity according to the demands of safety.

Prisoners of war shall be fed upon plain and wholesome food whenever practicable, and treated with humanity.

They may be required to work for the benefit of the captor's Government, according to their rank and condition.

A prisoner of war who escapes may be shot, or otherwise killed in his flight; but neither death nor any other punishment shall be inflicted upon him simply for his attempt to escape, which the law of war does not consider a crime. Stricter means of security shall be used after an unsuccessful attempt at escape.

If, however, a conspiracy is discovered, the purpose of which is a united or general escape, the conspirators may be rigorously punished, even with death; and capital punishment may also be inflicted upon prisoners of war discovered to have plotted rebellion against the authorities of the captors, whether in union with fellow prisoners or other persons.

If prisoners of war, having given no pledge nor made any promise on their honor, forcibly or otherwise escape, and are captured again in battle after having rejoined their own army, they shall not be punished for their escape, but shall be treated as simple prisoners of war, although they will be subjected to stricter confinement.

Every captured wounded enemy shall be medically treated according to the ability of the medical staff.

Honorable men, when captured, will abstain from giving to the enemy information concerning their own army, and the modern law of war permits no longer the use of any violence against prisoners, in order to extort the desired information, or to punish them for having given false information.

PARTISANS—ARMED ENEMIES NOT BELONGING TO THE HOSTILE ARMY—SCOUTS—ARMED PROWLERS—WAR REBELS.

Partisans are soldiers armed and wearing the uniform of their army, but belonging to a corps which acts detached from the main body for the purpose of making in-

roads into the territory occupied by the enemy. If captured, they are entitled to all the privileges of the prisoner of war.

Men, or squads of men, who commit hostilities, whether by fighting, or inroads for destruction or plunder, or by raids of any kind, without commission, without being part and portion of the organized hostile army, and without sharing continuously in the war, but who do so with intermitting returns to their homes and avocations or with the occasional assumption of the semblance of peaceful pursuits, divesting themselves of the character or appearance of soldiers, such men, or squads of men, are not public enemies, and therefore, if captured, are not entitled to the privileges of prisoners of war, but shall be treated summarily as highway robbers or pirates.

Scouts or single soldiers, if disguised in the dress of the country, or in the uniform of the army hostile to their own, employed in obtaining information, if found within or lurking about the lines of the captor, are treated as spies, and suffer death.

Armed prowlers, by whatever names they may be called, or persons of the enemy's territory, who steal within the lines of the hostile army for the purpose of robbing, killing, or of destroying bridges, roads, or canals, or of robbing or destroying the mail, or of cutting the telegraph wires, are not entitled to the privileges of the prisoner of war.

SAFE CONDUCT—SPIES—WAR-TRAITORS—CAPTURED MESSENGERS—ABUSE OF THE FLAG OF TRUCE.

Embassadors, and all other diplomatic agents of neutral powers, accredited to the enemy, may receive safe conducts through the territories occupied by the belligerents, unless there are military reasons to the contrary, and unless they may reach the place of their destination conveniently by another route. It implies no interna-

tional affront if the safe conduct is declined. Such passes are usually given by the supreme authority of the state, and not by subordinate officers.

A spy is a person who secretly, in disguise, or under false pretense, seeks information with the intention of communicating it to the enemy.

The spy is punishable with death by hanging by the neck, whether or not he succeed in obtaining the information or conveying it to the enemy.

If a citizen of the United States obtain information in a legitimate manner, and betrays it to the enemy, be he a military or civil officer, or a private citizen, he shall suffer death.

A traitor under the law of war, or a war-traitor, is a person in a place or district under martial law who, unauthorized by the military commander, gives information of any kind to the enemy or holds intercourse with him.

The war-traitor is always severely punished. If his offense consists in betraying to the enemy anything concerning the condition, safety, operations, or plans of the troops holding or occupying the place or district, his punishment is death.

If the citizen or subject of a country or place invaded or conquered gives information to his own government, from which he is separated by the hostile army, or to the army of his government, he is a war-traitor, and death is the penalty of his offense.

All armies in the field stand in need of guides, and impress them if they cannot obtain them otherwise.

No person having been forced by the enemy to serve as a guide is punishable for having done so.

If a citizen of a hostile and invaded district voluntarily serves as a guide to the enemy, or offers to do so, he is deemed a war-traitor, and shall suffer death.

A citizen serving voluntarily as a guide against his

own country commits treason, and will be dealt with according to the law of his country.

Guides, when it is clearly proved that they have misled intentionally, may be put to death.

All unauthorized or secret communication with the enemy is considered treasonable by the law of war.

Foreign residents in an invaded or occupied territory, or foreign visitors in the same, can claim no immunity from this law. They may communicate with foreign parts, or with the inhabitants of the hostile country, so far as the military authority permits, but no further. Instant expulsion from the occupied territory would be the very least punishment for the infraction of this rule.

The law of war, like the criminal law regarding other offenses, makes no difference on account of the difference of sexes concerning the spy, the war-traitor, or the war-rebel.

Spies, war-traitors, and war-rebels are not exchanged according to the common law of war. The exchange of such persons would require a special cartel, authorized by the Government, or, at a great distance from it, by the chief commander of the army in the field.

A successful spy or war-traitor, safely returned to his own army, and afterwards captured as an enemy, is not subject to punishment for his acts as a spy or war-traitor, but he may be held in closer custody as a person individually dangerous.

EXCHANGE OF PRISONERS—FLAGS OF TRUCE—FLAGS OF PROTECTION.

Exchanges of prisoners take place number for number, rank for rank, wounded for wounded, with added condition for added condition, such, for instance, as not to serve for a certain period.

In exchanging prisoners of war, such numbers of persons of inferior rank may be substituted as an equivalent

for one of superior rank as may be agreed upon by cartel, which requires the sanction of the government or of the commander of the army in the field.

A prisoner of war is in honor bound truly to state to the captor his rank, and he is not to assume a lower rank than belongs to him in order to cause a more advantageous exchange, nor a higher rank for the purpose of obtaining better treatment.

Offenses to the contrary have been justly punished by the commanders of released prisoners, and may be good cause for refusing to release such prisoners.

The surplus number of prisoners of war remaining after an exchange has taken place is sometimes released either for the payment of a stipulated sum of money, or, in urgent cases, of provisions, clothing, or other necessaries.

Such arrangement, however, requires the sanction of the highest authority.

The exchange of prisoners of war is an act of convenience to both belligerents. If no general cartel has been concluded, it cannot be demanded by either of them. No belligerent is obliged to exchange prisoners of war.

A cartel is voidable so soon as either party has violated it.

No exchange of prisoners shall be made except after complete capture, and after an accurate account of them and a list of the captured officers has been taken.

The bearer of a flag of truce cannot insist upon being admitted. He must always be admitted with great caution. Unnecessary frequency is carefully to be avoided.

If the bearer of a flag of truce offer himself during an engagement he can be admitted as a very rare exception only. It is no breach of good faith to retain such a flag of truce, if admitted during the engagement. Firing is not required to cease on the appearance of a flag of truce in battle.

If the bearer of a flag of truce, presenting himself during an engagement, is killed or wounded, it furnishes no ground of complaint whatever.

If it be discovered and fairly proved that a flag of truce has been abused for surreptitiously obtaining military knowledge, the bearer of the flag thus abusing his sacred character is deemed a spy.

So sacred is the character of a flag of truce, and so necessary is its sacredness, that while its abuse is an especially heinous offense, great caution is requisite, on the other hand, in convicting the bearer of a flag of truce as a spy.

It is customary to designate by certain flags (usually yellow) the hospitals in places which are shelled, so that the besieging enemy may avoid firing on them. The same has been done in battles, when hospitals are situated within the field of the engagement.

Honorable belligerents often request that the hospitals within the territory of the enemy may be designated, so that they may be spared.

An honorable belligerent allows himself to be guided by flags or signals of protection as much as the contingencies and the necessities of the fight will permit.

It is justly considered an act of bad faith, of infamy, or fiendishness, to deceive the enemy by flags of protection. Such act of bad faith may be good cause for refusing to respect such flags.

The besieging belligerent has sometimes requested the besieged to designate the buildings containing collections of works of art, scientific museums, astronomical observatories, or precious libraries, so that their destruction may be avoided as much as possible.

THE PAROLE.

Prisoners of war may be released from captivity by exchange, and, under certain circumstances, also by parole.

The term parole designates the pledge of individual good faith and honor to do, or to omit doing, certain acts after he who gives his parole shall have been dismissed, wholly or partially, from the power of the captor.

The pledge of the parole is always an individual, but not a private, act.

Release of prisoners of war by exchange is the general rule; release by parole is the exception.

Breaking the parole is punished with death when the person breaking the parole is captured again. Accurate lists, therefore, of the paroled persons must be kept by the belligerents.

When paroles are given and received there must be an exchange of two written documents, in which the name and rank of the paroled individuals are accurately and truthfully stated.

Commissioned officers only are allowed to give their parole, and they can give it only with the permission of their superior, as long as their superior in rank is within reach.

No non-commissioned officer or private can give his parole except through an officer. Individual paroles not given through an officer are not only void but subject the individuals giving them to the punishment of death as deserters. The only admissible exception is where individuals, properly separated from their commands, have suffered long confinement without the possibility of being paroled through an officer.

No paroling on the battle-field, no paroling of entire bodies of troops after a battle, and no dismissal of large numbers of prisoners, with a general declaration that they are paroled, is permitted or of any value.

In capitulations for the surrender of strong places or fortified camps, the commanding officer, in cases of urgent necessity, may agree that the troops under his command shall not fight again during the war unless exchanged.

The usual pledge given in the parole is not to serve during the existing war unless exchanged.

If the Government does not approve of the parole, the paroled officer must return into captivity, and should the enemy refuse to receive him he is free of his parole.

ARMISTICE—CAPITULATION.

An armistice is the cessation of active hostilities for a period agreed upon between belligerents. It must be agreed upon in writing, and duly ratified by the highest authorities of the contending parties.

If an armistice be declared without conditions, it extends no further than to require a total cessation of hostilities along the front of both belligerents.

If conditions be agreed upon, they should be clearly expressed, and must be rigidly adhered to by both parties. If either party violates any expressed condition, the armistice may be declared null and void by the other.

An armistice may be general, and valid for all points and lines of the belligerents; or special, that is, referring to certain troops or certain localities only.

An armistice may be concluded for a definite time, or for an indefinite time, during which either belligerent may resume hostilities on giving the notice agreed upon to the other.

The motives which induce the one or the other belligerent to conclude an armistice, whether it be expected to be preliminary to a treaty of peace, or to prepare during the armistice for a more vigorous prosecution of the war, does in no way affect the character of the armistice itself.

An armistice is binding upon the belligerents from the day of the agreed commencement, but the officers of the armies are responsible from the day only when they receive official information of its existence.

An armistice is not a partial or a temporary peace; it is only the suspension of military operations to the extent agreed upon by the parties.

When an armistice is concluded between a fortified place and the army besieging it, it is agreed by all the authorities on this subject that the besieger must cease all extension, perfection, or advance of his attacking works, as much so as from attacks by main force.

But as there is a difference of opinion among martial jurists whether the besieged have the right to repair breeches or to erect new works of defense within the place during an armistice, this point should be determined by express agreement between the parties.

So soon as a capitulation is signed the capitulator has no right to demolish, destroy, or injure the works, arms, stores, or ammunition in his possession during the time which elapses between the signing and the execution of the capitulation, unless otherwise stipulated in the same.

CHAPTER IX.

FIELD FORTIFICATIONS.

Parapet—Ditch—Indented Line—Redan—Lunette—Redoubt—Profiling—Revetments—Embrasures—Loop Holes—Traverses—Tête de Pont—Intrenched Camps—Block-house—Obstacles—Abatis—Trous de Loup—Small Pickets.

Chapter IX.

FIELD FORTIFICATIONS.

The ground occupied by a work is denominated the site or plane of site.

The ground plan of a fortification may have a multitude of shapes, according to varying circumstances; but the cross-section or profile of the work is essentially the same in all, consisting of the embankment *or parapet* and the ditch.

Intrenchments are not only used defensively but may sometimes have a direct and decisive *offensive* effect, as in a campaign they may be equivalent in effect to a large reinforcement of troops.

Field-work parapets are usually made of earth, sometimes of clay, sand, or logs.

Clay is more tenacious than common earth, but a parapet of this material requires more time for its construction.

One man can carry 100 empty sand bags, weighing about 60 pounds.

These bags should be made of canvas or gunny-cloth, and, when empty, should be 2 feet 8 inches long and 1 foot 4 inches wide. When filled and laid they occupy a space of 6 by 10 by 24 inches, and contain .85 of a cubic foot of sand, weighing about 85 pounds.

The bags should not be more than three-fourths full when laid, as, if full, they do not lay as well, besides being more liable to burst on becoming wet or under great pressure.

When time is of importance, the bag need not be tied, but the throat is given a twist and turned under the end of the bag as it is laid.

Thirty-two sand bags make a cubic yard, and one hun-

dred and forty-five bags, laid as above, make ten superficial yards of revetment.

A sand-bag parapet is very rapidly constructed and is preferable to an earthen one when speedy cover is required.

A parapet of loose sand is excellent, but as the slopes can never be steep (unless protected by a revetment) they will oppose but slight obstruction to an assault.

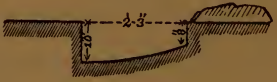


Fig. 3.—Shelter-pit for skirmishers.

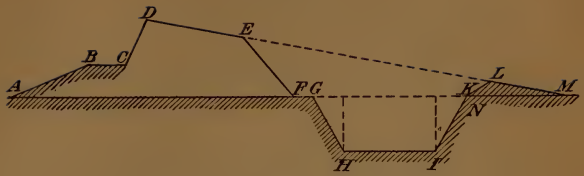
The simplest forms of intrenchments are *rifle pits* (see figure), constructed by digging a slight ditch and throwing the dirt on the *side toward the enemy*. In this case the troops stand or kneel in the ditch and derive their shelter partly from the ditch and partly from the dirt thrown up on its bank; the usual case, however, is where the parapet is on the side of the ditch from the enemy.

The efficiency of an intrenchment as a defense depends chiefly on the dimensions of the parapet and of the ditch as traced on a vertical plane passing through them both, the outline thus traced being called the *profile* (see Plate VIII).

To protect the assailed from the assailant's fire, and to prevent the latter easily surmounting it in an assault, the height of a parapet above the ground on which it stands should be not less than 8 nor more than 12 feet.

The thickness of the parapet should be one-third greater than the penetration of the heaviest projectiles that will be used against it; ordinarily, 12 feet will be found sufficient for light artillery; against heavy artillery, it should be from 24 to 36 feet. Against 12-inch rifle, 1,500 yards, a thickness of 45 feet of loose earth is required.

The penetration of field guns (M. L. R.) at 1,000 yards is from 3 to 5 feet in earth, 1 to 3 feet in soft wood, ½ foot



Profile of Parapet and Ditch.

Fig. 1.

A B C D E F	Profile of the parapet.
G H I K	Profile of the ditch.
L M N	Profile of the glacis.
A B	The banquette slope.
B C	Tread of the banquette.
C D	The interior slope.
D E	The superior slope.
E F	The exterior slope.
F G	The berm.
G H	The scarp.
H I	Bottom of the ditch.
I K	Counterscarp.
A	Foot of the banquette slope.
B	Crest of the banquette.
C	Foot of the interior slope.
D	The interior crest.
E	The exterior crest.
F	Foot of the exterior slope.
G	Crest of the scarp.
H	Foot of the scarp.
I	Foot of the counterscarp.
K	Crest of the counterscarp.
L	Crest of the glacis.
M	Foot of the glacis.

6 Men, 6 Picks, 6 Shovels. Time 1 hour.
50 Cubic ft. per task
Scale 10 ft to 1 inch.

Gun Epaulement.

Fig. 2.

to 1¾ feet in brick. The penetration into sand is about two-thirds the penetration into earth, and about one-half that into clay. As a wide and deep ditch materially strengthens the work before which it is placed, if time and men permit, the thickness of the parapet should be from 12 to 14 feet.

Recorded experiments give somewhat conflicting results on the penetration of rifle balls, but, to be on the safe side, the following thicknesses are necessary to give security against infantry fire: At 100 yards, clay loosely thrown up, 4 feet; sandy or gravelly earth loosely thrown up, 3 feet; sand bags filled, 1.25 feet; pine (soft), 16 to 18 inches; oak and elm (green), 6 inches; ash (green), 4.5 inches; at 300 yards, the penetration into earth is about 14 inches; soft wood, 5 inches; brick, .5; iron, .5; steel, .13. At a distance of 20 yards, a rope mantlet 4 inches thick is proof against a rifle-musket shot.

The ditch should be at least 6 feet deep and over 12 feet wide across the top.

To prevent the earth of the parapet from crumbling into the ditch, the foot of its outer slope is made to rest at a little distance from the edge of the ditch (from 2 to 6 feet).

In common soil one man can excavate 1 cubic yard per hour (in sandy soil nearly double this), and can work at this rate for eight hours.

To find the time required for the construction of a trench or parapet in ordinary soil, multiply the area of the section of the trench in square feet by the interval between the diggers (in feet), and divide this product by 27; the quotient will be the number of hours required for the construction of the work.

Conversely, to find the area of the section of the trench or breastworks which can be executed in a given time, multiply the number of hours by 27 and divide the product by the interval (in feet) between the diggers; the quotient will be the area in square feet of the section of the trench or breastwork.

A trench 3 feet deep with a breastwork 3 feet high (giving a cover of 6 feet) may be completed for one rank in three hours, and for two ranks in five hours. A trench 2½ feet deep with a breastwork 2 feet high for one rank only can be made in one and one-half hours.

In ordinary soils a man with a pick can furnish employment to two men with shovels.

Not to be in each other's way, the men should be from 4½ to 6 feet apart.

A shovelfull of earth can be pitched by a man 12 feet in a horizontal or 6 feet in a vertical direction.

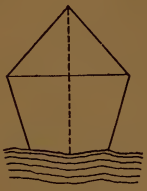
When the flanks of a position are secure from being turned by reason of precipices, impassable mountains, water, or morasses, it may be fortified by a *cremaillere* or *indented line.*

Fig. 4.—Indented line.

Should a position be assailable on the flanks as well as in front, while the rear is secure, either of the following may be used, *i. e.:*

Redan.

Fig. 5.



Lunette.

Fig. 6.

If, however, a position is assailable on all sides, then a redoubt must be used. There are a number of different kinds, the square being the simplest, and as the latter requires comparatively little time and labor for its construction, it is better adapted for a naval force than any other.

All redoubts have the same defects, *i. e.*, the ditches are unprotected, and there is a sector without fire in front of each angle.

In the square redoubt, the sectors without fire may be considerably remedied by cutting the corners off and re-

Fig. 7.—Square redoubt with pan-coupées.

placing them by shoulders, making what are called *pan coupées;* this still leaves the ditches dead space, so that

if the enemy once reach them they will be comparatively secure. The minimum length of side for a square redoubt capable of holding artillery is 40 yards; this gives a work capable of containing one field-piece at each angle and about 250 men.

In the defense of a field work every linear yard of the parapet should be defended by at least two men. There should also always be a reserve, consisting ordinarily of one-third of the entire garrison.

When a work is armed with artillery 6 linear yards of a parapet must be allowed for each gun.

The dimensions of a work depend, of course, on the line bounding it, or, in other words, on the length of the parapet or interior crest (regardless of its shape).

Hence when the force to garrison a work is known, the number of yards in the interior crest is *one-third of the number of the garrison added to six times the number of guns.*

The quantity of earth to be excavated is proportional to the proposed dimensions of the parapet.

The number of cubic feet of earth excavated from each linear yard of the ditch is equal to the number of cubic feet of earth required for each linear yard of the parapet.

To determine the exact dimensions of the ditch for a given parapet requires a mathematical calculation, but on the field a result may be obtained approximately correct for practical purposes by *assuming the depth of the ditch and dividing the surface of the profile of the parapet by it; the quotient will be the width.*

The site of the work having been selected and its character and dimensions determined, the *profiling*, or laying out of the work on the field, then follows. To this end erect poles at the angles of the work and mark on them the desired height of the interior crest. Then trace a line on the ground with a pick, showing the direction of the interior crests. Next stretch cords between stout pickets

in a direction perpendicular to the line marked out by the pick. These cords should be exactly horizontal and at convenient distances apart, say, 15 or 20 yards.

Where the cords pass above the pick-line drive stakes firmly into the ground and nail to each a slip of wood on which the height of the interior crest is marked. The thickness of the parapet is then measured on the cords and pickets driven into the ground to mark the points. The base of the interior slope and the tread of the banquette are set off in a similar manner and a slip of wood nailed to each picket.

The height of the interior crest and the tread of the banquette are easily ascertained from the position of the cord and the interior crest; these points having been marked on their respective slips the outline of the parapet is shown by connecting them by other slips which are nailed to uprights.

The banquette slope and exterior slopes will be determined by a similar process.

From the profiles thus formed, perpendicular to the interior crests, the oblique profiles at the angles can readily be set up.

Having completed the profiling, the foot of the banquette and that of the exterior slope are marked out with the pick; also the crests of the scarp and counterscarp.

To distribute the workmen, the counterscarp crests should be divided into length of 12 feet, and the interior crest into lengths of 9 feet. In each area thus marked out a working party is arranged, consisting of a pick with two shovels near the counterscarp, two shovels near the scarp and one man to spread and one to ram for each two working parties.

In making the parapet, care should be taken to form a drain at some suitable point to carry off the water from the interior into the ditch. The water from the drain should not be suffered to run down the scarp, as it would

soon destroy it. A gutter formed of boards should be made to prevent this.

In field-works revetments are used only for the interior slope of the parapet and for the scarp; sod-work forms a strong and durable revetment; they should be from 12 to 18 inches long and 4½ inches thick. If the grass is long it should be mowed before the sod is cut. In the absence of sod, fascines or boards may be used. Fascines are bundles of twigs bound closely together; the ordinary size is 9 inches in diameter and 10 feet long.

A hurdle revetment may be made by driving poles in the same direction as the interior slope into the banquette about 18 inches below the tread, and thus forming a wicker-work by interlacing twigs between them.

There are two ways of placing the artillery: first, on the banquette, openings called *embrasures* being made through the parapet; and, second, on a mound of earth thrown up against the interior slope to enable the guns to fire over the parapet, *en barbette*, as it is called.

Light guns are better placed *en barbette*, as, although exposed to the enemy's fire, yet they have a wider field of fire and can be quickly withdrawn if the enemy's guns open upon them.

It is well to place several guns together, if practicable, as a heavy fire can thus be concentrated on one point.

If embrasures are used, care should be taken that the muzzle enters them to the depth of 6 or 8 inches. If *loop-holes* are made they should be at least 3 feet apart and not less than 6 feet above the outside ground.

If any part of the interior of a work is exposed to the enemy's fire, mounds of earth are thrown up high enough and thick enough to protect that part from fire. These mounds are called *traverses*. The same object is sometimes accomplished by adding to the height of a portion of the parapet or by depressing the *terre plein* (the level interior).

The powder-magazine should be in a position least ex-

posed to the enemy's fire. If the soil is dry it may be made partly under ground. The simplest plan is to make a frame of wood, cover it with heavy planking, and then cover the whole with at least 5 feet of earth. The mouth of the magazine should be covered by a *splinter-proof shelter*, made by placing poles or scantlings at an angle of about 45 degrees, so as to cover the mouth and leave an easy access to it; these should be covered with 3 feet or more of earth or sod.

A *tête de pont*, or bridge head, is a field intrenchment at or near the end of a bridge, to protect it. When possible batteries should be placed on the opposite shore to afford support.

INTRENCHED CAMPS.

Troops, when within striking distance of the enemy, should, to avoid the consequences of a surprise, be en-

In Trench. | *In the Open.*

Fig. 8.

camped always in order of battle. The modern practice is to intrench, if encamped even for one night. Such intrenchments are usually of the slightest and most

hastily constructed kind, merely sufficient to afford shelter against a night attack.

When, in consequence of attack by the enemy, or of his threatening attitude, the force stands upon the defensive, the slight intrenchments of a temporary camp are increased and strengthened until they become a strong *intrenched line of battle.*

The gun pits, which before were separate for each piece, are now united by a continuous epaulment, and all woods within musket range in front of the line are slashed, for the double purpose of destroying them as cover for the enemy and for transforming them into an entanglement difficult for him to pass. This work is done by the infantry, the artillery having its full share of labor in intrenching the batteries.

BLOCK-HOUSE.

This is a species of small redoubt, and intended for an isolated point which can be approached by stealth or strategem, requiring the garrison to be constantly on the alert. They are especially useful in the defense of bridges against cavalry raids.

A block-house should be 10 feet high in the clear, and from 20 to 25 feet square, logs 16 to 18 inches in diameter being used. They may be built up in the manner of log houses, but it is preferable to set the logs up vertically.

The roof should be made of heavy logs, projecting about 18 inches beyond the walls on all sides, and then covered with a layer of earth 4 feet thick at the crown and running down to 6 inches at the eaves.

Loop-holes for musketry are cut through the walls about 8 feet above the floor. A banquette of planks should be carried around the interior about feet from the floor, and about 6 feet in width; this serves also as a substitute for bunks.

Machine-guns are eminently adopted for block-houses,

and next to these, howitzers. Each house should be provided with two or more such pieces, embrasures for which are cut so as to sweep the main avenues of approach.

Around the outside should be dug a V-shaped ditch, the earth being thrown up against the sides of the house, at an angle of 45 degrees, as high as the soles of the loop-holes.

A well constructed abatis, wire entanglement, or other obstacle should surround the work at a distance of about 100 yards.

OBSTACLES.

These are placed in front of field-works (and also in the rear of a retreating force) to embarrass the approach of the enemy.

The following is a partial list:

Abatis are trees cut down, deprived of their smaller branches and the remainder sharpened to a point. If the branches are properly intertwined one within the other their disengagement is extremely difficult. Abatis are an excellent means of blocking up a road.

Trous-de-loup are pits in the form of inverted cones. They should be 6 feet deep 18 inches in diameter at the bottom and about 6 feet in diameter at the top. A pointed stake is driven in the bottom of each one.

They are generally placed in three rows, in quincunx order, a few yards in front of the ditch.

Small pickets consist of straight branches of tough wood about 3 feet long. They are driven into the ground in quincunx order, about a foot apart, and project above the ground from 12 to 18 inches; they should be interlaced with cord, brambles, &c.

Mines are deposits of gunpowder placed under the glacis and connected with a hose or train leading under the parapet. They are exploded from the inside when the enemy arrives over them. Their principal effect is the panic they produce.

CHAPTER X.

PASSAGE OF RIVERS.

Passage on Ice--Floating Bodies--Rafts--Flying Bridges--Pile Bridges—Trestle Bridges—Road-Ways—Destruction of Bridges—Demolition of Guns.

Chapter X.

PASSAGE OF RIVERS.

The passage of rivers, especially in the presence or vicinity of an enemy, is one of the most difficult and dangerous of all the operations of a campaign. It may require on the part of the commander the highest qualities of discretion, secrecy, promptness, and audacity; and from the men absolute obedience, silence, coolness, and a certain amount of mechanical skill.

Rivers may be passed by fords, on ice, on floating bodies, and on bridges. Fording is the quickest and most convenient mode of crossing a river, and the selection of the safest place is a matter of some practical importance.

The depth of a ford should not exceed 3 feet for infantry and 2 feet 4 inches for artillery; if the current is gentle infantry can take a ford 4 feet deep.

When the location of a ford is known, before attempting to use it, swimmers should be sent in to ascertain if it is suitable for use.

It should be remembered that for a small party a bottom of hard sand or gravel is the safest, but that a sandy bottom is dangerous for a large force.

If the current is very swift a line should be stretched across the stream, to serve for those who loose their footing to seize hold on.

Infantry should pass first and artillery last. The order of passage is *usually* in column of platoons at nearly full distance.

As a rule, the best ford seldom leads directly across a stream; it should be selected at a point where the width

of the stream is greater than usual, with the point of egress some distance down the stream, in order that those crossing may secure the advantage of the current.

In fording it is important to keep the eyes fixed on some point ashore and not to look at the water, particularly when the water course is broad or the current rapid.

PASSAGE ON ICE.

This is an exceedingly precarious mode of passing a river. Great care and prudence are requisite in the operation to prevent frightful accidents.

The heaviest guns may cross on ice 6 inches thick; light guns on ice 4 inches thick; infantry in small detachments, or in single file, on ice 3 inches thick.

Ice which does not rest on water cannot be trusted, unless it is at least 6 inches thick, and even then it should be crossed with great caution.

FLOATING BODIES.

If boats are used, and but a limited number can be obtained, it is well to remember that four boats lashed together can carry 80 per cent. more than when used alone.

Rafts may be used instead of boats. They have the advantage of not being liable to be sunk by the enemy's fire, but are troublesome to construct, and require time. If made of logs the logs should be fastened together with cross pieces and arranged with the buts and tops alternating.

The following table shows the approximate weight per cubic foot of certain woods:

	Pounds.
Willow	25
Poplar	24
Fir	32
Elm	36
Sycamore	37

	Pounds.
Pine	40
Beech	43
Ash	47
Oak	54

When green the weight is about one-quarter more.

Seasoned wood increases one-sixth in weight in a few days after being placed in the water, unless both ends of the logs are tarred.

To find the weight of a tree calculate its contents in cubic feet and multiply the result by the weight of one cubic foot of the wood.

To ascertain the weight which will submerge a piece of timber of given dimensions take a cubical block of any size and ascertain its weight; fill a vessel with water, immerse the block in it and find the weight of the water it displaces; the difference between the weight of the block and that of the water displaced will give the weight which, placed on the block, would be sufficient to submerge it. Multiply this difference by the weight of a cubic foot of water (62½ pounds) and divide the product by the weight of the water displaced; the quotient will be the weight necessary to submerge a block of a cubic foot. Multiply this result by the number of cubic feet in the given piece, and the product will be the total weight sought.

The cubic contents of a log may be found by adding together the areas of the two ends and four times the area of the section at the middle of the trunk, and multiplying this sum by one-sixth the entire length.

Rafts of empty casks may be made to bear any load by lashing a sufficient number together. They cannot be relied on for a safe passage except on narrow and gentle streams.

To make the raft place the casks in a row side by side, bungs up; lay two saplings or rails, called gunnels, along

them, 4 inches from each end. Pass slings of strong rope under the casks from end to end of the gunnels, fastening the ends of the sling to the gunnel; between the casks place brace lashings.

To determine the number of casks required to construct a raft to support N pounds, multiply the number of gallons the cask will contain by 11.97, and from the product subtract the weight of the cask; the remainder will be the buoyancy of the cask in pounds. Take a sufficient number of casks to bring this weight up to N pounds.

Flying bridges are boats or rafts held by a hawser or chain, which prevents it descending the river, and is caused to go from one bank to another by being held by a rudder oblique to the current. They are usually formed by connecting two boats by a platform consisting of joists laid across the boats, and a flooring of planks on the joists. The cable is attached to this platform and passes over a cross-piece supported above the platform by two uprights so as to work clear of the deck in the movement of the bridge, a sliding pulley or block being placed between them, the cable passing through an eye in the pulley. The cable is secured at the other end by an anchor or any other fixed point or support.

The cable should be one and a half times the width of the river, and should be kept above the water by floats at suitable intervals.

A windlass is placed on the platform toward the stern, to which the cable is fastened. It serves to let the cable out in case of danger from the action of the wind or current and to take up the slack when necessary.

If the velocity of the current is the same on both shores the anchor should occupy the middle point of the stream if it is greater near one than another, then the anchor should be placed near the shore where the velocity is the least. Thirty-six men can in an hour construct a flying bridge on six boats (each boat 31 feet long, and 6 feet

wide), which can carry 250 men. To insure proper progress the velocity of the current should not be less than 2 miles per hour, and the side of the raft should be kept at an angle of 55 degrees.

BRIDGES.

If a stream is too wide to be spanned by a single tree a good footway may be secured by felling several trees on each bank opposite to each other, the tops of the trees pointing well up stream, and the butts retained ashore.

Fig. 9.

Thus the trees *b* and *c*, selected so as to cover the most sluggish positions of the current, have their tops closely interlacing up stream in consequence of the current at *d*.

Additional trees, like *a*, are selected so as to strengthen the work, being made fast to the banks farther up stream. In this way the foundation for a temporary bridge may be quickly and readily made.

The officer superintending the construction of a bridge is responsible that it is strong enough to support the weight it is intended to carry. To prevent its being overstrained, he should place a sign-board at either end stating the greatest permissible load, thus: "Bridge to carry infantry in fours," or "in single file," or "light 3-inch howitzers," &c.

Width of roadway.—A width of 8 feet *in the clear* suffices for infantry in fours, but a width of 9 feet is preferable; 6 feet in width will take infantry in column of twos, and field-guns passed over by hand; 1½ to 3 feet will take infantry in single file. Infantry marching by fours causes a load of 225 pounds for each lineal foot of roadway. When crowded by a check in front, the load is increased to about 550 pounds. In addition to this, to each running foot of bridge must be added about 100 pounds as weight of superstructure.

Bridges on piles over shallow rivers can quickly be constructed for the passage of infantry and howitzers. The diameter of the piles need not be more than 6 inches, arranged in series of twos placed about 8 feet apart. If a bridge is intended for permanent use, the piles should be a foot in diameter and from 20 to 30 feet apart, and sunk at least 3 feet in the river bottom. If the current is strong or danger is to be apprehended from floating brushwood, the piles should be protected by triangular *cribs* of logs raised at least 2 feet above the water-line, and filled with rock and gravel. Brushwood should be thrown in the bottom and around the sides of the *cribs*, as it prevents the gravel from washing out.

Trestle bridges are principally useful in crossing small streams, not more than 6 or 7 feet deep with firm and even channels, and the current not swifter than 5 feet per second.

Trestles should consist of a stout cap or ridge-piece 8 inches square and from 12 to 16 feet long fitted to four legs (4½ inches square) of a length proportional to the depth of the river. The spread of the legs at the bottom is equal to one-half the sum of the height and length of the cap, their inclination to one-twelfth of the height. The legs should be fastened to the cap about 18 inches from the ends. Trestles should be placed with their lengths in the direction of the current and at intervals

of 12 to 15 feet. On them should be placed the beams which support the roadway, and lastly the roadway itself, which can be made of planking, split logs, or saplings.

The following figure shows a very simple style for the framework of a bridge over deep ravines.

Fig. 10.

To construct the bridge fall two trees on each side of the ravine, cut them the desired length, trim off the branches, and, if time permits, peal off the bark (which adds greatly to the weight). Place each set of two poles thus prepared 7 or 8 feet apart and nail on them a cross-piece 3 or 4 inches in diameter, projecting about a foot on each side of the poles. The cross-pieces should be placed about one-fourth of the length of the poles from their small ends. Next nail, or fasten with rope, second cross-pieces under the poles a couple of feet from the small ends, the frames thus formed being directly opposite each other, and the long ends of the frames resting against the sides of the ravine. Raise the frames by means of ropes to an angle of about 45 degrees, taking care that the ends against the banks do not slip or give way. Take two poles, pass them under the front cross-pieces, and rest them on the projections of the top cross-pieces, then lower both frames carefully, when the poles will become so locked as to make a strong framework. Cross-pieces may then be laid and a roadway built; if necessary it can be braced at any time in various ways.

Such a bridge was built by the writer in Alaska over an impassable stream, of raw materials and with unskilled

workmen, which readily bore a test strain of 5 tons with scarcely any depression.

To measure the breadth of a river without instruments and without crossing it:

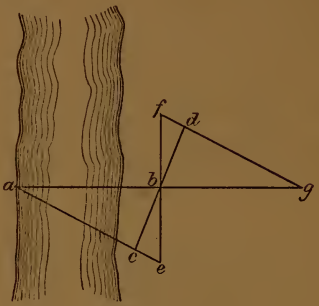


Fig. 11.

(1) To find the distance *a b* (Fig. 11). Assume *dc* in any direction and make *bc* = *bd* (*ab* being as nearly perpendicular to the banks as practicable); then locating *c* on *ac* produced, make *bf* = *be*; join *f* and *d* and prolong *fd* to *ab* at *g*; then *bg* = *ab*.

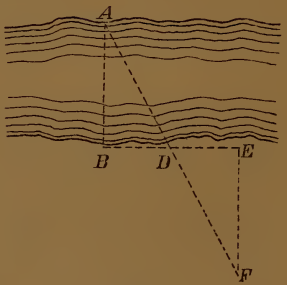


Fig. 12.

(2) To find the distance A B (Fig. 12). Draw and measure on the shore the line BDE of any convenient length

perpendicular to AB. Measure EF perpendicular to BE, also of a convenient length and observe the point D. Where the line FD cuts BE measure DE and DB; then we have from the similar triangles ABD and DEF, the proportion DE: EF: DB: AB.

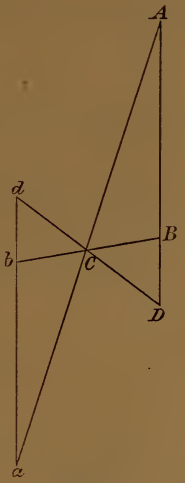


Fig. 13.

(3) To measure AB (Fig. 13) prolong it to any distance to D; from D in any direction take equal distances DC and C*d* and produce BC to *b* making C*b* = CB; join *db* and produce it to *a* where AC produced intersects it; then *ab* = AB.

To determine the height of a tree, or precipice:

(1) Plant a vertical staff (equal in length to the height of the observer's eye) at such distance from the foot of the required height that the observer, lying upon his back with his feet against the bottom of the staff, is in

the same line. Then the height of the object equals the distance from the eye to its base.

(2) Place a looking-glass upon the ground and level it with a cup full of water upon it; retire until the top of the object is reflected in it. Then the height of the object equals the height of the eye above the mirror multiplied by the distance of mirror from the object divided by the distance of mirror from the observer.

The surface velocity of a stream may be determined by carefully noting the time required for a chip or any small substance to float a measured distance.

The mean velocity of water in rivers $= \frac{(\sqrt{v}-1)^2}{2} + v$,

where v is the superficial velocity expressed in inches.

The following are the usual expressions applied to river velocities:

Approximate velocities.

	Per second.	Per hour.
	Feet.	*Miles.*
Sluggish	1½	1
Ordinary	3	2
Rapid	5	3
Very rapid	8	5
Torrent	*9	6

* Or more.

ROADWAYS.

In swamps and marshy grounds a roadway of timber or stout brushwood, or even of trusses of hay or straw, will frequently have to be resorted to. After opening a way of sufficient width and cutting down the stumps, so as not to impede the passage of the howitzers, the trunks of the largest trees are cut into lengths of about 15 feet and are laid across the line at distances of 10 or 20 feet apart; notches are cut into the cross-pieces about 13 inches from each end and sufficiently large to receive trunks of trees from 9 to 12 inches in diameter; these trunks should be

cut into pieces of as great length as the tree will afford. Across these longitudinal pieces the bodies of small saplings 3 or 4 inches in diameter are laid, and brushwood, earth, or straw laid over them to make the roadway more regular.

A very fair roadway may be formed by laying saplings crosswise without any other superstructure.

DESTRUCTION OF BRIDGES.

Nothing is of greater importance to a retreating force than to destroy the bridges in its rear, in order to retard the advance of the enemy.

To destroy a stone bridge with gunpowder, a trench in the form of a cross is made in the crown of the arch, the branches of which are about 10 feet in length, and sunk to the top of the arch stones. For an arch 3 feet thick, 160 pounds of powder are placed in each trench; strong planks are then laid over the powder and covered with rubbish. The fire is communicated by means of powder hose, or Bickford's fuse; the former burns at a rate varying from 10 to 20 feet per second, and the latter at about 2 feet per minute.

The amount of powder required by this method to destroy the arches of a masonry bridge may be determined from the formula $X = \frac{3}{8} A^2 \times B$, in which X is the charge in pounds, A the line of least resistance through the arch, and B the breadth of the bridge, both in feet.

Stone bridges are destroyed also by simply cutting a trench about 18 inches deep across the crown of the arch, and placing in it 345 pounds of powder, covered in the manner just described; this quanity has been found sufficient to destroy semi-circular arches of 25 feet span, and 3 feet thickness at the key.

The amount of powder required by this method is determined from the formula $X = \frac{3}{7} A^2 \times B$ (see formula above).

Wooden bridges may be pulled to pieces, burned, or blown up. The best method of burning such bridges is to tar them and then cover or surround them with tarred underbrush. Wooden bridges may be blown up by large charges of powder suspended under the superstructure and fired in the manner described for stone bridges. A quicker and more certain way of destroying bridges is effected by the use of compressed gun-cotton, which is, weight for weight, four times as strong as gunpowder, and requires no tamping. Compressed gun-cotton is stored damp, and in this state it is perfectly safe for transport and handling, as it can only be detonated by the agency of a small quantity of dry gun-cotton, called a primer, and a detonater. The detonater is fired in the ordinary way or by electricity. Compressed gun-cotton is made in many convenient sizes and forms, as one-half ounce, and one ounce discs, 1 pound or 2 pound slabs, etc.

Generally it should be evenly distributed over the surface of stone bridges; if heaped, it forces its way through. Supports of timber bridges may be destroyed by a girdle of half-ounce discs tied round them; or if time avails by charges placed in auger holes bored in them. One-half ounce of gun-cotton is sufficient for each square inch of the sectional area of the support.

Iron bridges are destroyed by attacking the bottoms of the piers, or in case of girder bridges, the junction of two girders.

1¼ pounds of compressed gun-cotton per square foot, lineal, laid against an 18-inch brick wall will destroy it.

The number of pounds of powder required to destroy brick walls may be determined by the formula $X = \frac{1}{2} T^2$ per running foot, untamped, or $\frac{1}{4} T^2$, tamped, in which X = number of pounds required, T = thickness of wall.

A wrought-iron rail can be destroyed by detonating 8 ounces of compressed gun-cotton placed unconfined upon

the rail. Steel rails, weighing 73 pounds to the yard, can usually be broken by 4 ounces of gun-cotton.

A bag of 50 pounds of gunpowder suspended to a gimlet screwed in the center of an ordinary door or gate will, when exploded, blow it to peices.

DEMOLITION OF GUNS.

With iron guns, detonate 1½ pounds of gun-cotton on the outside of the chase near the muzzle or half fill with powder, jam in a couple of round shot with nails, bits of iron, stones, &c., tamp up to the muzzle with stones and a little earth, and fire by means of a long fuse laid to the vent. The trunnions are easily broken off by a sledge hammer, which renders a gun comparatively useless. Brass guns are easily destroyed by firing a shot from another into them behined the trunnions. Breech-loading guns are disabled by carrying off or destroying the breech-blocks, &c.

To spike a gun, drive into the vent a jagged and hardened steel spike, with a soft point, break it off flush with the vent and clinch it in the bore with the rammer; a nail without a head, a piece of ramrod, or even a plug of hard wood may be used in the absence of a spike.

CHAPTER XI.

SIGNALING.

Reconnaissance—Armed, Topographical—Station Party—Visual Signaling—Fireworks.

Chapter XI.

SIGNALING.

A signal officer cannot be too well educated nor too good a soldier.

The forming and discipline of the signal parties require some knowledge of organization, of military rules, the manual of arms, and of tactics.

In providing for his own safety on lonely stations, in his marches with small escorts, his reconnaissances, and in the drawing of the papers in which finally are summed the results of his labors, he will find ample exercise for all soldierly knowledge he can gain.

The duties of signal officers in time of war are to gain, as reconnoitering officers, all knowledge of the country, of the movements of the enemy, and the position of our own forces, which, communicated to the commander, may aid in forming his plans.

Preparatory to an action the signal corps and its escort should be divided into two parts: (1) A reconnoitering party. (2) A party for service at different stations.

RECONNAISSANCES.

It is always necessary to know beforehand, from a careful examination, the position of the enemy, his strength, and the disposition of his forces, the weak points of his position, and the mode of attacking the same, and the nature of the country.

Reconnaissances are either armed or topographical.

Armed reconnaissances are made to procure information with reference to the position and force of the enemy. So long as a commander is ignorant upon these points he

can have no confidence in his measures, either for attack or defense.

Reconnaissances must not be confounded with the reconnoitering of patrols of grand and advance guards, which simply assure themselves of the position of the enemy without entering into either the tactical arrangements or the topographical strength of their position.

The commander of a reconnoitering party usually receives written instructions, which he should perfectly understand before setting out. He should have a map of the country (if practicable), a field glass, and necessary writing and sketching materials. He should procure two or three of the residents of the country to act as guides and to answer his questions relative to the names and sizes of villages, character of the roads, extent of woods, features of streams and the country generally. He should take with him an officer who speaks the language of the country if he does not speak it himself.

A detachment intrusted with such a duty should take all the precautions of advance guards, flankers, &c.; scouts should examine roads, ravines, woods, villages, &c., where the enemy might be concealed.

The commander should note particularly the features of the country he passes through in order to determine in advance points upon which he might fall back and make a stand if necessary.

The first thing to be done by an officer in acquiring the *coup d'œil militaire* is to learn both from books and on the field what space is taken up by a battalion and its intervals, by a squadron, and by a battery when in order of battle, how much when in columns of march, and the average time required for certain movements under given circumstances of ground. (For appearance of objects at various distances see chap. VII.)

When an enemy's position is reconnoitered with a view to force him to show his hand by causing him to call out all his troops, a large detachment of all arms adequate to

the task of pressing the enemy vigorously, and also of withdrawing with safety when pressed in line, must be thrown forward.

The commander of a reconnoitering party should avoid an engagement that would draw him off from his object, for his mission is not to damage the enemy but to discover his plans and acquire an accurate idea of his position.

Secret reconnaissances are conducted upon entirely different principles; few men are taken, in order to both elude the observations or pursuit of the enemy. The effort is made to approach by night the point that is to be reached.

The detachment moves stealthily through ravines and hollow roads, making long detours to avoid meeting the patrols of the enemy, and returning by some other way to escape any trap he may have laid.

The detachment should consist of twenty men and of several non-commissioned or petty officers, who in case of need might take the place of officers.

When a reconnaissance is finished, the officer who has had charge of it should give to the commander-in-chief a written report when a verbal one would be insufficient. This report should be clear, simple, and as brief as possible. The officer should mention only those things of which he is certain, his conjectures should be presented with caution, and he should carefully avoid drawing upon his imagination for facts. Finally, he should not speak much of himself. For if there is ground for pride on account of the manner in which the duty has been performed the troops should receive all the praise, from him at least.

When practicable the report should be accompanied with a field sketch of the localities and the dispositions and defenses of the enemy.

Small reconnaissances are made every morning at the advanced posts to ascertain that the enemy has not come

nearer during the night. They advance a short distance beyond the line of posts. This is a special duty, for which all officers should be detailed in turn. They seldom remain out more than an hour and in the mean time the grand guards and pickets are kept under arms.

TOPOGRAPHICAL RECONNAISSANCES.

Before making a plan of an attack it is necessary for the commander-in-chief to obtain an accurate knowledge of the ground.

He should know the distance between places, obstacles to be encountered, nature of the soil, quality of the roads, state of rivers and bridges, exact slope of mountains, hills, &c.

Certain signs have been adopted into general use as follows:

Sand by fine dots.

Gravel by coarse dots.

Meadows by tufts or little perpendicular lines.

Trees sometimes by clumps of foliage, sometimes by distinctive foliage; the former is better; if the character of the tree is desired its name can be written under it.

Dwellings, &c., usually in plan, made distinctive by some small prefix, as a pair of scales for a court-house, a sign-post for a tavern, a horseshoe for a smithy, a church with a cross, &c.

Hills by two methods, vertical lines and horizontal lines.

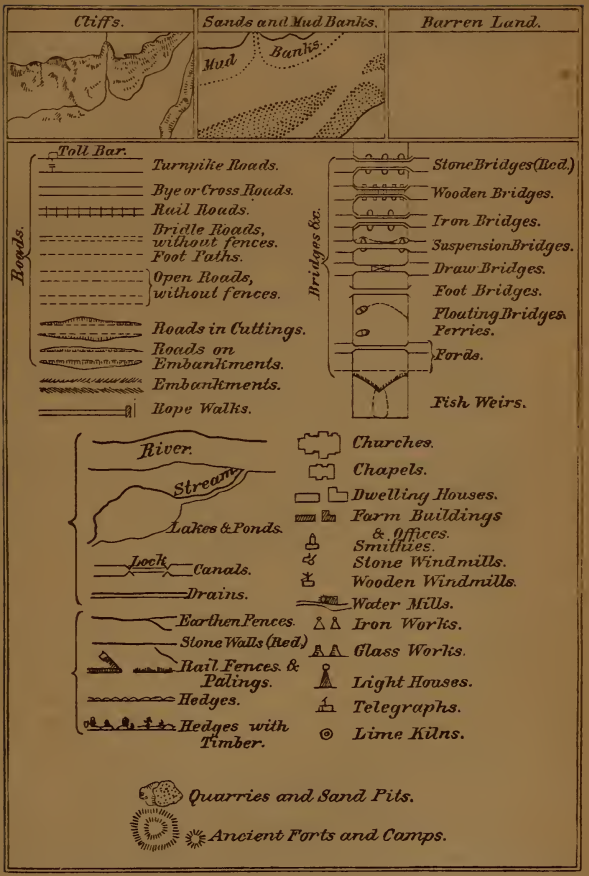
Water courses by two crooked lines, one heavier than the other; as a finish, other lines may be added between these. An arrow indicates the direction of the current.

Creeks, &c., by single zigzag lines.

Passage of streams by a boat or bridge; a ford by dotted lines.

Lakes, &c., by lines of contour, inclosing other lighter lines.

PLATE X.


Cliffs.
Sands and Mud Banks.
Barren Land.
Mud
Banks.
Roads.
Toll Bar.
Turnpike Roads.
Bye or Cross Roads.
Rail Roads.
Bridle Roads, without fences.
Foot Paths.
Open Roads, without fences.
Roads in Cuttings.
Roads on Embankments.
Embankments.
Rope Walks.
Bridges &c.
Stone Bridges (Red.)
Wooden Bridges.
Iron Bridges.
Suspension Bridges.
Draw Bridges.
Foot Bridges.
Floating Bridges.
Ferries.
Fords.
Fish Weirs.
River.
Stream.
Lakes & Ponds.
Lock
Canals.
Drains.
Earthen Fences.
Stone Walls (Red.)
Rail Fences. & Palings.
Hedges.
Hedges with Timber.
Churches.
Chapels.
Dwelling Houses.
Farm Buildings & Offices.
Smithies.
Stone Windmills.
Wooden Windmills.
Water Mills.
Iron Works.
Glass Works.
Light Houses.
Telegraphs.
Lime Kilns.
Quarries and Sand Pits.
Ancient Forts and Camps.

Marshes by lines of contour and horizontal lines or tufts of grass in the center.

Rocks imitated as closely as possible; sometimes simply the name is written at the place they should occupy on the sketch.

Villages, a circle filled with parallel lines.

Town, a square.

Roads, &c., A principal road by two parallel lines: smaller roads the same except that the lines should be closer together.

A complete written synopsis should accompany the sketch explanatory of the sketch itself and of such additional points as may be of value.

STATION PARTY.

The station party occupy points upon or near the field whence they can view the enemy's position and the circumjacent country and report continuously during the progress of the action to the headquarters station.

If communication is to be between ships in a bay or river the officers will consult together, if possible, before parting, as to the place at which the ships will probably be, the color of the flags it will be best to use, and in what direction by compass the vessels will be from each other.

A few preconcerted signals for possible events should be arranged before landing; and the landing signalist and the signalist to remain aboard ship should together determine some points on shore from which the first communication shall be had.

In a reconnaissance of a field of battle the signal officer must notice carefully how many lines of battle there are, and must not fail to report their number.

If furnished with a scale glass he must find the distance and direction of almost every marked object in the enemy's line, particularly in reference to batteries, reserves, ammunition teams, &c. Reports of these distances and

directions should be sent to the brigade commander, to any battalion commanders near by, and to officers commanding batteries.

Note carefully and report the direction in which the enemy's guns are pointed or fields they seem to cover; see where their cavalry are posted or where they have cavalry pickets out.

Study closely the ground in corn-fields, in groves, in fields covered with low bushes, behind stone fences, for lines of men in ambush, or for masked guns. Seek such forces not only in front of the lines, but far to the right and left over which the troops are to pass.

If the enemy are covered or are covering any part of their line with breastworks or in trenches the fact should be fully reported upon.

If the enemy commences to change a line, notify the commander-in-chief at once, and report from time to time the progress of the movement.

Lines of battle may be described by their number, length, position, and the direction in which they extend.

Artillery, cavalry, and infantry by the number of guns, the regiments, or time of passage at the ordinary rate of march.

Before sending out scouts or detachments, certain elementary signals should be agreed upon. For instance,

Fig. 14.

let a wave with one hand designate "hurry," "come on," &c.; let both arms raised designate "yes," "all right,"

&c.; let both arms lowered designate "no," "wrong," &c.; and let both arms extended laterally and horizontally designate "halt," "go back," &c. Such a precaution will frequently do away with the necessity of messengers making difficult and dangerous journeys. A distant scout might signal by walking from right to left or from left to right, &c.

Army and Navy code for visual signaling.

ALPHABET.

A, - —	J, - — — —	S, - - -
B, — - - -	K, — - —	T, —
C, — - — -	L, - — - -	U, - - —
D, — - -	M, — —	V, - - - —
E, -	N, — -	W, - — —
F, - - — -	O, — — —	X, — - - —
G, — — -	P, - — — —	Y, — - — —
H, - - - -	Q, — — - —	Z, — — - -
I, - -	R, - — -	

NUMERALS.

1	2	3
- — — — —	- - — — —	- - - — —
4	5	6
- - - - —	- - - - -	— - - - -
7	8	9
— — - - -	— — — - -	— — — — -
	0	
	— — — — —	

PUNCTUATION.

Period (.) - - - - - -

CONVENTIONAL SIGNALS.

"*To call*" *a station.*—Signal its initial or "call letter" until "acknowledged;" if the "call letter" is unknown, signal the letter "A" without pause until "acknowledged."

"*To acknowledge.*"—Signal the letters "O K," followed by "front" and initial or call letter.

End of address; end of sentence; end of message.—Signal the period (.), followed by "front."

"*To break*" *or stop the signals from the sending station.*—Signal the letter "A" until acknowledged.

"*To start*" *the sending station after* "*breaking.*"—Signal "GA" followed by "front" and the last word received correctly, or if no word was received correctly, signal "RR," followed by "front" the sender will then repeat all.

"*Error in sending.*"—Signal six dots (. . . . .) very rapidly, followed by "front," and resume the message, beginning with last word sent correctly.

"*Signature follows.*"—Signal "Sig," followed by "front."

"*Cease signaling.*"—Signal the word "close" *three* "fronts." The communicating station will "acknowledge," followed by *three* "fronts."

For convenience the numerals of the code may be used to signal the following sentences:

1, "Wait a moment"; 2, "Are you ready"; 3, "I am ready"; 4, "Go up higher"; 5, "Come down lower"; 6, "Move to your right"; 7, "Move to your left"; 8, "Use other (color) flag"; 9, "Use larger (or two) flags and longer staff"; 0, "Your signal man is not facing me squarely."

TO SIGNAL WITH FLAG OR TORCH.

The flagman faces exactly toward the communicating station; staff is vertical in front of center of body, butt

at height of waist. The dot (.) is represented by a quick motion to the right, and a dash (—) by a motion to the left of the sender; each motion will embrace an arc of 90°, starting from and returning to the vertical, and will be made in a plane exactly at right angles to a line connecting the two stations. At the end of each word, abbreviation, or conventional signal, a "front" motion is made. These three motions are exactly the same as heretofore prescribed for the motions "1," "2," and "3," respectively, in the general service code. There will be no pause, whatever, between the motions required for any single letter.

The following abbreviations may be used in the body of a message:

A, after; B, before; C, can; H, have; N, not; R, are; T, the; U, you; UR, your; W, word; WI, with; Y, why.

Numbers which occur in the body of a message must be spelled out in full; dates and other numbers not in the body of the message will be signaled by numerals. A "front" motion will not be made between separate numerals of a number, but only after the last figure. The numerals may be used in signaling between stations having the naval signal books.

TO SIGNAL WITH THE HELIOGRAPH OR ANY OTHER "FLASH" OR "OCCULTATION" LIGHT.

The signals are made in the same manner as with the electric telegraph key, except that the spaces between the *elements* of a *letter* should be slightly longer.

"*To call*" *a station*.—Turn a steady flash on the station and keep it there until answered by a steady flash. Both stations will then take plenty of time and adjust nicely, each on the other's flash When the adjustment is satisfactory the calling station will cut off its flash three (3) seconds, and then "acknowledge" by same signal as used

for flag, and proceed at once with the message in the same manner as with the flag (using the same conventional signals), except that a pause of four (4) seconds will be made wherever "front" would be sent if the message were signaled by flag.

If the *receiver* fails to get any word correctly, he will "break" the *sender* by the same signal as with the flag, but the *sender* will answer by turning on a steady flash. The *receiver* will then signal "GA," followed by the last word received correctly, and the *sender* will immediately "acknowledge" and resume his message, beginning with the word indicated by the *receiver*.

No abbreviations will be used in body of message.

"*Adjustment.*"—If the receiver sees that the sender's mirror needs adjusting, he will turn a steady flash on the sender until answered by a steady flash; then the *receiver* will "acknowledge," and the *sender* will resume his message, beginning with the word broken into.

Opera glasses are invaluable as night glasses. With most persons they nearly double the limit of vision and enable their eye-sight to compare favorably with that of night-roving animals.

The glittering of the sun upon the arms of distant troops indicates the direction of their march. If the rays seem perpendicular and constant, they are moving toward you; if slanting to the right and downwards, they are moving to your right; if the rays are varied and intermittent they are moving away from you.

Dust raised by infantry forms a dense low cloud, while that raised by cavalry forms a higher and lighter one.

A column of infantry will generally pass over about 5 miles in two hours, halts included. A column of cavalry at a walk and trot alternately, makes about 6 miles per

hour. To calculate the time, T, necessary for the execution of a march, let D be the distance to be accomplished, d the distance that the men comprising the column pass over in an hour (halts included), Z the length of the column, O the delay caused by obstacles: then $t = \frac{Z}{d}$ will be the time that passes until the left arrives at its destination, and the formula $T = t + O + D$ will give the time sought. One of the elements of O is the lengthening Z′ of a column in a defile; it is considered by introducing $\frac{Z'}{d}$ into the formula: O is also the delay caused by marching across fields These elements may all be estimated and introduced into the formula.

Forces landing at night and moving inland, so as to be covered by woods, &c., may first indicate their progress and preconcerted messages by Very signals, rockets, or bombs, thrown above the trees and can receive the recognition by guns or other sound signals. If landed in the daytime cartridge-puffs, or heavy smokes could be raised. If there is a commanding peak near where the enemy offer battle, signal officers should be hurried to it. The enemy should be kept constantly in view from the time the position is reached; the knowledge to be gained by witnessing thus the formation of their forces, by estimating their strength before their lines are in position and by witnessing early what preparations are made for the battle may be invaluable.

Information as to the best points of view in any particular direction, can generally be had from citizens.

It is a rule in any case when without special information to seek the summit of the highest hill in reach. The party should carry axes, as the felling of a few trees or bushes will often make a station otherwise of little value the most useful for observations.

When the position of the enemy is known, it must be

observed whether there are elevated points behind him whence communication may be had over his forces, to others on his front or flank, these points being, perhaps, known to be in friendly hands. In such a case, signal parties must be sent far round the enemy's flanks to occupy them at every hazard. Reconnaissances carefully made and reported under circumstances of this kind may be most valuable.

Signal parties of reconnaissance may gather information in relation to the enemy from the statements of citizens—the inquiries being as to the numbers, number of guns, wagons, length of train and of the column, &c.

Messages written with or without cipher may be concealed for transmission in the common lead pencil, it being first opened and hollowed for the purpose, and then joined as it was originally, or they may be packed in hollow canes from which the handle or ferrule easily removes. They have been packed in bullets, brass buttons, &c.

A safe way is to carry the message or paper on top of the charge in a loaded pistol or rifle; it is then easily disposed of in case of surprise and capture.

Papers are sometimes worked in between the leathers of the soles of boots or shoes, in the linings of clothing, &c.

The devices for this kind of transportation are so numerous that there is hardly an article which it is safe to allow a suspected person passing the lines to carry, until it has been rigorously examined.

FIREWORKS

Slow match is used to preserve fire. It may be made of hemp or cotton rope; if made of hemp the rope is saturated with acetate of lead or the lye of wood ashes; if made of cotton it is only necessary that the strands be

well twisted. Slow match burns from 4 to 5 inches an hour.

Quick match is made of cotton yarn (candle-wick) saturated with a composition of mealed powder and gummed spirits and then left to dry. It is used to communicate fire and will burn at the rate of one yard in thirteen seconds.

Port fires are paper cases 22 inches long containing a composition of niter, sulphur, and mealed powder, the flame of which will quickly ignite primers, guide-match, &c. It will burn with an intense flame for ten minutes.

Blue light.—A very brilliant one may be made as follows: 14 parts niter, 3.7 parts sulphur, 1 part realgar, 1 part mealed powder. Drive in a paper core and cut off to suit required time of burning. A light in which the composition is 1.5 inches in diameter can be seen 15 miles.

Carcass.—The composition is the same as for port fire mixed with a small quantity of finely chopped *tow* and so much *white* turpentine and spirits of turpentine as will give it a compressible consistency.

Place a bursting charge in the bottom of an empty shell and drive in the composition until the shell is nearly full; then insert three or four strands of quick match secured by driving more composition. This projectile after burning as a carcass, explodes as a shell. It is used for setting fire to ships, buildings, &c.

Fire balls are oval-shaped canvas sacks filled with combustible composition of 8 parts niter, 2 parts sulphur, and 1 part antimony. After being mixed the composition is moistened with one-thirtieth of its weight of water. They are usually fired from mortars, the object being to light up the enemy's works. The balls are filled by pouring a portion of the composition into the sacks, placing a loaded shell (fuze down) upon it, and then ramming more of the composition around it until the sack is full.

To prime it drive into the top of the composition a

greased wooden plug about 3 inches deep; withdraw the plug and fill the hole with a quick-burning composition; it is well to insert a few strands of quick match. The bottom of the sack should be protected from the force of the charge by an iron or wooden *culot* and the whole strengthened by a net-work of spun yarn and then overlaid with a composition of pitch, rosin, &c.

Light balls are made in the same manner, except that being used to light up our own works, the shell is omitted.

Tarred links are used for lighting up a rampart, defile, &c. They consist of coils of soft rope placed on top of each other and loosely tied together. They are then immersed for about ten minutes in a composition of 20 parts of pitch and one of tallow. When dry they are plunged into a composition of equal parts of *pitch* and *rosin* and rolled in tow or saw-dust. To prevent the composition sticking to the hands they should be copiously covered with linseed oil. Tarred links will burn one hour in calm weather, half an hour in a high wind, and are not extinguished by rain. Two links are usually placed in an open grate or basket separated from each other by shavings. To light up a defile the links should be placed about 250 feet apart; to light up a march the men who carry the grates should be placed to leeward of the column and about 300 feet apart.

Fagots of vines, twigs, or other combustible wood about 20 inches long and 4 inches wide, tied in three places with iron wire, may be treated in the same manner.

Torches may be made as follows: Take some old rope, untwist it, and boil it in a solution of equal parts of water and niter (saltpeter); after it is dry tie three or four pieces, each 4 feet long, around the end of a pine stick about 2 inches in diameter and 4 feet long; cover the whole with a mixture of equal parts of sulphur and mealed powder (moistened with brandy) and fill the interval between the cords with a paste of three parts of

sulphur and one of quick lime. When it is dry, cover the whole with a composition of three parts pitch, three parts Venice turpentine (a compound of rosin and turpentine), and one-half part turpentine. These torches will burn from one and a quarter to two hours. In lighting the march of a column the men who carry the torches should be 100 feet apart.

Very dense smokes may be raised by kindling a large fire with dry wood and piling upon it the green boughs of pine, balsam, or hemlock.

White light—the composition is niter 16 parts, sulphur 8 parts, mealed gunpowder 3 or 4 parts.

(Gunpowder is mealed by placing a quantity in a canvas bag and beating the bag with a *wooden* mallet. A small quantity can be pulverized on a piece of a plank or a mess table (free from nails) by beating with a wooden mallet. It should then be sifted through a coarse cloth. There is absolutely no danger in pulverizing powder if care be taken. Metal, stone, &c., must not be used.)

Yellow light—add to the above four parts of powdered rosin.

Red light—add four parts nitrate of strontium.

Green light—add four parts acetate of copper.

Blue light—add four parts zinc filings.

Purple light—two parts chlorate of potassa, one part sulphur.

Bengal lights—seven parts niter, two of sulphur, one of antimony.

An intense light may be made by mixing magnesium with any of the above, or by mixing some in a charge of gunpowder.

These may be packed in pasteboard cases, a piece of bamboo, or a tin can; a piece of quick match should be placed in the top to facilitate lighting.

Pasteboard cases are made by tightly wrapping thickly glued pasteboard around a piece of wood 1 inch or

more in diameter. The stick is then withdrawn and one end of the case closed by drawing a piece of string tightly around it and then dipping the end in melted rosin.

Firing rockets—attach the stick to the rocket and place the stick in a trough or tube as a guide; a musket barrel will answer the same purpose, or it may be fired from the hand by placing the end of the stick on the ground and resting the case lightly in the hand, extended at arm's length.

If the wind is blowing freshly from any direction it is best to slightly incline the rocket against the wind. If a rocket misses fire it should be laid on the ground so that if it has any burning fire it may not disarrange the signal shown.

The time of the ascent of the navy rocket is from seven to ten seconds, and it will attain a height of 500 yards. Under favorable circumstances it is stated it can be seen from 30 to 40 miles, but ashore the distance will be much less, especially in a wooded or mountainous country.

CHAPTER XII.

HINTS TO COOKS.

Tables, &c.—Dough—Field Bread—Butter—Coffee—Tea—Chocolate—Soup—Meat—Baked Beef Head—Game—Remarks on Pork—Fish—Sod Ovens—Ovens in Bank—Receipts for Twenty-two Men.

Chapter XII.

HINTS TO COOKS.

To cook rapidly and well is an art which can be easily acquired, and which every man should learn. It is of paramount necessity that men's food should be carefully looked after. This duty should never be left to a non-commissioned or petty officer, but should be carefully attended to by the company officers themselves.

To insure success in cooking, accurate measurement, proper mixing, and preciseness in the preparation of ingredients are very important.

Approximate weights and measures.

Three teaspoonfuls ..... one tablespoonful.
Four tablespoonfuls ..... one wine glass.
Two wine glasses ..... one gill.
Two gills ..... one cup.
Two cupfuls ..... one pint.
One quart sifted flour ..... one pound.
One quart powdered sugar ..... one pound, seven ounces.
One quart granulated sugar ..... one pound, nine ounces.
Seven tablespoonfuls of same ..... one half-pint.
One pint closely packed butter ..... one pound.
One tablespoonful of salt ..... one ounce.
Ten eggs ..... one pound.

Approximate time-table for cooking vegetables.

Potatoes, old, boiled ..... thirty minutes.
Potatoes, new, baked ..... forty-five minutes.
Potatoes, new, boiled ..... twenty minutes.
Sweet potatoes, boiled ..... forty-five minutes.
Sweet potatoes, baked ..... one hour.
Squash, boiled ..... twenty-five minutes.

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Squash, baked	forty-five minutes.
Shelled beans	one hour.
Tomatoes, fresh	one hour.
Tomatoes, canned	thirty minutes.
Cabbage	forty-five minutes to two hours.
Dandelions	two to three hours.
Beet greens	one hour.
Onions	one to two hours.
Beets	one to five hours.
Turnips, white	forty-five minutes to one hour.
Turnips, yellow	one and a half to two hours.
Parsnips	one to two hours.
Carrots	one to two hours.

Nearly all these vegetables are eaten dressed with salt, pepper, and butter, but sometimes a small piece of lean pork is boiled with them and seasons them sufficiently.

An easy method to test the heat of an oven.—If the hand and naked arm can be held within the oven for fifteen seconds, the temperature is about right. If this cannot be done without distress the oven is too hot. If the exposed part can be held comfortably in the oven for this length of time, it is too cold. This method allows the cook to determine the proper degree of heat approximately. Experience will enable him to arrive at it precisely.

SEASONING.

As salt and pepper are always at hand for use on the table, they should be used sparingly in the kitchen in the preparation of food. It is much easier to add these articles to the prepared food than to eliminate them from it.

MIXING.

Preciseness in the preparation of ingredients is an important element of success in cooking. Accurate measuring is the habit of the careful and industrious cook; guessing at proportions is the practice of the indifferent and lazy cook.

TO CLEAN UTENSILS.

Boil a handful of hay or grass in a new iron pot before using it for cooking purposes. Then scrub it on the inside with soap and sand.

Fill the pot with clean water, set it on the fire, and allow to boil half an hour. After this it is ready for use.

Immediately after using a pot or frying pan, fill it with hot water and set it over the fire to scald thoroughly. New tins should stand near the fire filled with boiling water, in which has been dissolved a spoonful of soda. Soda is used to render soluble the rosin which has been used in soldering. Then scour with soft soap and rinse with hot water. Keep them clean by rubbing with sifted wood ashes.

Copper utensils should be scoured with brick-dust, vinegar, and flannel, and then thoroughly washed with hot water and rubbed dry. Copper should never be used unless it is bright and free from spots.

Never set a cooking utensil away without cleaning and drying it. If grease is left in the vessel, it will become rancid. If it is set aside, rust will be the result.

Clean knives with soft flannel and bath-brick. If rusty, use wood ashes rubbed on the knife with a freshly cut portion of an Irish potato; this will remove all spots.

All the cooking utensils should be frequently exposed to bright sunlight. Crocks, jars, and all earthenware vessels are purified by a similar exposure.

All new cooking utensils should be thoroughly cleansed before they are used, and ever after that kept scrupulously clean.

One of the principal elements of success in cooking is the proper provision of the few most indispensable articles of kitchen and table furniture.

The frying pan is the most invaluable of all cooking utensils. It may be made to serve a host of purposes; fish and game may be cooked in it, stews prepared, flap-

jacks made, coffee roasted, &c. The handle should be detachable, or have a parasol joint made close to the pan, so that it may be folded across it.

To extemporize stoves and cooking places the usual and most simple mode is to dig a trench 18 inches wide, 12 inches deep, and from 4 to 6 feet long. At each end place a forked stick of equal height, with a stout sapling from which to suspend the kettles, extending from one to the other.

SOD OVENS.

Upon the ground, with top soil removed, describe a circle with a radius of about 1 foot 10 inches for a hearth. Place a layer of sod of good size, about 12 or 14 inches long by 8 or 10 inches wide, slightly wedge-shaped and 2 or 2¼ inches thick, upon the ground close to the outside of this figure, but all the sod about the same size. Place upon the lower layer another with their ends passing to the interior, and projecting over the first about 1½ inches; continue to build in this manner until the crown or dome is closed to within 4 or 5 inches. This will probably require about fourteen layers of sod. The upper rows should break joints with those below them. Be careful to pin down with wooden pegs the sod of each layer near its outside edge, commencing with the bottom, as soon as laid. The top of the dome is capped with a single or double sod. Close all joints or crevices with mud, and cover the lower sods heavily with earth pressed down; diminish the quantity of earth as you approach the top; the upper sods require but little over them.

It would not be advisable to construct an oven in this manner with larger dimensions than the foregoing.

The door is usually rectangular, and closed with sod during baking if no other material is available. A slope is dug to approach the front of the oven, and a landing for working it made.

AN OVEN IN A STEEP BANK.

This is recommended as a very good and convenient oven. A bank from 4 to 6 feet high is the best for the purpose. Two men with a spade and a long handled shovel can build it in light soil in three-quarters of an hour. If such tools are not available, it may be constructed with intrenching tools, or even with knives. To build the oven, dig down the bank to a vertical face and excavate at the base a hole from 4 to 5 feet horizontally, care being taken to keep the entrance as small as possible; hollow out the sides of the excavation, and arch the roof until the floor is about 2 feet 6 inches in its widest part and the roof 16 inches high in the center of the arch. Then tap the back end for the flue. A hole from 4 to 6 inches in diameter will furnish a good draft. A piece of stovepipe may be utilized for this purpose. It will be advantageous, before using, to wet the whole interior surface of the oven, and smooth it over neatly, drying it out and hardening it with a small fire. The time required for drying out will depend upon the character of the soil; if ordinarily dry, a fire kept up for an hour will suffice.

Such an oven has a capacity of about forty rations, and will bake good bread in about fifty minutes. With proper care it will last several weeks. Bake-pans may be used in baking, if they can be obtained; if not, the bare floor, after the ashes are removed, may be used to bake on. After the introduction of the dough, the flue and door should be closed, which may be done with logs of wood. When there is no bank near, and it is expected to occupy camp for several days the best plan, perhaps, is to make an artificial bank by digging a pit about 4 feet long, 3 wide, and 5 feet deep, and then to build a bank oven. The pit should be protected from rain.

DOUGH.

This may be mixed in mess-pans, on a piece of canvas on a rubber blanket, or in a flour barrel or flour sack

Empty tomato cans, &c., can be used as vessels in which to draw tea, make coffee, &c.

FIELD BREAD BAKED IN FRYING PAN.

Prepare the dough; grease the frying pan and set it over hot embers until the grease begins to melt; put the dough rolled to a thickness of half an inch in the pan and set it on the fire; shake the pan every few moments to prevent the dough from adhering; after the crust has formed on the bottom take the bread out of the pan and set it up on edge close to the fire turning it occasionally to insure its being baked through.

One man, using six pans, can bake 25 pounds of bread in this way in less than one hour.

A piece of the dough can be saved and kept in the flour sack. Within twenty-four hours it will have turned sour, and can be used instead of baking powder to leaven the next batch of bread. Where neither baking powder nor sour dough is available, put a small quantity of salt and flour in the water, beat the water with a fork until foam rises, and then mix quickly with more flour until a thin batter is formed, which can be cooked as "slap-jacks" in a frying pan well greased.

BUTTER.

When butter has become rancid it may be rendered again eatable by melting it and shaking it repeatedly with boiling water for the purpose of removing the free fatty acids; and if the melted butter be then poured into ice-cold water, it is stated to assume the appearance of fresh butter.

COFFEE.

Coffee should be quickly and evenly roasted to a light brown color. A few burned grains will impart a disagreeable flavor to it when made. Only a sufficiency for four or five days should be roasted at one time, and it should never be ground until required for use.

The following is an excellent method of making coffee both in barracks and in the field. It is the favorite receipt at Delmonico's:

Heat the grounds hot in a mess-pan, one tablespoonful to each person and one for the pot or kettle; then pour on boiling water, one cupful for each spoonful of coffee. Cover tight and stand where it will keep hot, but not boil, for fifteen or twenty minutes. Then strain into the cups. The coffee should never be boiled. "Coffee boiled is coffee spoiled" should be remembered.

TEA.

The making of tea should be so timed that it may be served as soon as drawn, and the water used should be fresh from the well or spring. Bring the water to a boil as soon as possible; fill the heated pot or kettle with boiling water, put into it one teaspoonful of tea for every cup of tea that is to be drawn, and set the covered kettle on the stove or near the fire to draw, but not to boil. It should not draw long enough to dissolve the tannin, which gives the tea an astringent taste. The time for drawing varies with the different teas, and is about as follows: Green tea, five minutes; Oolong tea, eight minutes; English breakfast, fifteen minutes.

CHOCOLATE.

Six tablespoonfuls of scraped or grated chocolate to each pint of water; add as much milk (if procurable) as water, and sweeten to taste. Put on the water and

bring it to a boil: rub the chocolate smooth in a little cold water, and stir into the boiling water. Boil twenty minutes: add the milk and boil ten minutes more, stirring it frequently. Sweeten upon the fire or in the cups.

SOUP.

The principal nourishment of meat soup comes from the raw meat. Failure in making soup is generally owing to rapid boiling and neglecting to skim the pot. The pot should be kept covered while the soup is cooking, except when it is necessary to skim and add the necessary ingredients. If cooked meat is to be used, it should be added after the soup has cooked nearly an hour.

When vegetables are used they should be added about one hour and a half before it is cooked, or only in time to become thoroughly done.

MEAT.

Good, fresh beef presents the following characteristics: The lean, when freshly cut, is of a bright red color, easily compressed and elastic, the grain fine and interspersed with fat of a yellowish-white color. The suet should be firm and perfectly white. In good mutton the fat is white also.

All frozen meats, game, and fish should be put into cold water to thaw before they are cooked. Meat should not be placed in contact with ice, nor wrapped in anything that may impart a flavor. It becomes more tender and digestive by keeping it awhile.

BAKED BEEF HEAD WITHOUT COOKING UTENSILS.

Dig in the ground a hole of sufficient size and build a fire in it. After the fuel has burned to coals put in the head, neck downward. Cover it with green grass, coals, and earth. Build a good fire over the buried head and

keep it burning for about six hours. Unearth the head and remove the skin. A head treated in this way at night will be found cooked in the morning. The head of any animal may be cooked in this way.

GAME.

The viscera should be taken out as soon as the game is killed. If the meat is not to be cooked at once hang it up in a cool dry place. Birds should be kept in their feathers and animals in their skins.

At least twelve hours should elapse between the time of killing and cooking birds; but they should be drawn as soon as possible. If the bird is young, the lower part of its legs are soft and the lower mandible will not sustain its weight.

REMARKS ON PORK.

Young pork has a thin skin, easily indented, and the lean will break by pinching. If fresh, the meat is smooth and dry, but if damp and clammy it is not good. If the fat contains small kernels the meat is diseased and should not be eaten.

REMARKS ON FISH.

Fresh fish are best when just taken from the water. They are fresh when the eyes are clear, the fins stiff, the gills red and hard to open. Unless fish have been frozen or have inhabited muddy streams they should not be soaked. If frozen, soak them in ice-cold water to thaw. If they have inhabited muddy streams, after they have been cut up soak them in strong salt water. A fish or part of a fish of less than three pounds weight, except rock fish, is too small for boiling. Exact time for boiling fish cannot be given, as much depends upon the size and kind. A piece of fresh codfish weighing 3 pounds will cook in from eighteen to twenty minutes. Salmon should

be allowed a longer time, while six or seven minutes per pound will be enough for sheephead, rockfish, &c. Mackerel need from ten to twelve minutes; herring and many other kind of fish scarcely half so long. As a general rule fish with white flesh require less time for boiling than fish with dark flesh.

TO COOK FISH WITHOUT COOKING UTENSILS.

Dig a hole in the ground about 18 inches deep and of sufficient size to contain the fish; build a fire in it and let it burn to coals. Remove the coals, leaving the hot ashes at the bottom, upon which place a thick layer of green grass; place the fish on top and cover with another layer of grass; then rake back the live coals and loose earth and build a small fire on top. At the end of about three-quarters of an hour the fish will be found cooked, with the juice retained. The skin will peal off and leave the flesh clean and free from ashes and dirt.

RECEIPTS.

KIDNEY SOUP.

[Sufficient for 22 men.]

2 ox kidneys.
1 pound suet.
1 pound onions.
6 ounces salt.
5 ounces sugar.
¼ ounce pepper.
3½ gallons water.

WELSH SOUP.

[Sufficient for 22 men.]

3 pounds fat.
22 leeks.
½ ounce mixed spice.
Herbs.
6 ounces salt.
1 ounce pepper.
4 ounces sugar.
2 pounds flour.
3½ gallons water.
4 pounds bread.

ST. PATRICK'S SOUP.

[Sufficient for 22 men.]

6 pounds meat and fat.
6 pounds potatoes.
1 pound onions.
1 pound celery.
1 pound turnips.
1 pound carrots.
1 large cabbage.
1 pound flour.
6 ounces salt.
6 ounces sugar.
6 tablespoonfuls of vinegar.
3½ gallons water.

ONION SOUP.

[Sufficient for 22 men.]

5 pounds fat and bones.
10 pounds onions.
1 head celery.
1 pound flour.
6 ounces salt.
4 ounces sugar.
½ ounce pepper.
3½ gallons water.
4 pounds bread.

IRISH STEW.

[Sufficient for 22 men.]

16½ pounds meat.
16 pounds potatoes.
4 pounds onions.
6 ounces salt.
1 ounce pepper.
½ pound flour.

RICE TOAD IN THE HOLE.

[Sufficient for 22 men.]

4 pounds rice.
2 pounds sugar.
2 quarts milk.
¼ ounce salt.
½ ounce cinnamon.
22 apples.

INDIAN MEAL DUMPLINGS.

[Sufficient for 22 men.]

3 pounds Indian meal.
1 pound flour.
1 pint molasses.
1 ounce salt.
1 pound suet or fat.

ARTILLERY PIE.

[Sufficient for 22 men.]

8 pounds bread.
1 pound suet.
4 dozen apples.
2 pounds sugar.

BAKED RICE PUDDING.

[Sufficient for 22 men.]

4 pounds rice.
1 pound sugar.
2 quarts milk.
¼ ounce salt.
½ ounce cinnamon.

POTATO PIE.

[Sufficient for 22 men.]

16½ pounds meat.
20 pounds potatoes.
1 pound onions.
3 ounces salt.
½ ounce pepper.

RICE AND POTATO PUDDING.

[Sufficient for 22 men.]

2 pounds rice.
6 pounds potatoes.
1 pound suet.
1 quart milk.
2 pounds sugar.
½ ounce salt.

CHAPTER XIII.

HINTS ON CARE OF HEALTH.

Wounds, &c.—Stretchers—Sunstroke—Muddy Water—Cramps—Corns—Burns—Scalds—Poisons—Emetic—Stings—Snake Bites—Broken Bones—Bleeding—Scurvy—Poultices—Treatment of the apparently Drowned—Frost Bites.

Chapter XIII.

HINTS ON CARE OF HEALTH, WOUNDS, INJURIES, ETC.

Being frequently detached from all transportation, an officer in command might be called upon, in case of accident, to resort to numerous expedients to relieve the sick and succor the wounded. He should know how to make stretchers and how to transport them.

Avoid carrying the stretcher on the shoulders. The front and rear bearers of the stretcher should be "out of step," and men of equal height, strength, and length of step, so far as is practicable, should be selected. The sick or wounded man should be carried with his face toward the direction in which he is moving. In crossing ditches, dikes, hollows, fences, &c., the stretcher should be kept horizontal.

The following stretchers may be readily extemporized:

(1) A blanket is held by four men, one at each corner, and is then doubled so that the two loops shall be brought together at each end; one pole (or two rifles lashed together) passes through the four loops, while another passes within the double of the blanket on the other side.

(2) Roll a small stone into each corner of the blanket and thus form projections which will prevent the slipping of the string or thongs with which it is made fast to a frame of poles, or rifles lashed together; this stretcher may be still further simplified and less material required when two corners of the blanket are fastened to a short cross-piece at the head, while the other end is gathered up and tied all together to the main pole.

The pressure of the pole on the shoulder (most readily borne on the shoulder) when bearing the stretcher may be diminished by a short pole or gun held lever-wise over the other shoulder, so as to take a portion of its weight.

(3) Four rifles and two coats, in a great emergency, may be made into a stretcher. The sleeves of one coat are turned into the inside. The rifles are then passed through the sleeves (muzzle to muzzle) and firmly lashed together, when the coat is buttoned throughout the front.

Each officer and man, on going into the field, should carry on his person, in a water-proof pocket or envelope, a bandage and a piece of lint. Such a precaution will often avoid much suffering.

Sunstroke may be prevented by wearing a silk handkerchief in the crown of the hat, by a wet cloth, or by moistened green leaves or grass.

A wounded man is always thirsty; give him cold water, but never spirits.

An old soldier drinks and eats as little as possible while marching. The recruit, on the contrary, is continually munching the contents of his haversack and using his canteen; it is a bad habit and causes much suffering in the end.

Never go to sleep, especially after a great effort, even in hot weather, without some covering over you.

For sunstroke, remove the collar, loosen the shirt and coat, and continue to throw cold water on the head and spine until consciousness returns.

Muddy water may be purified by filtering; sand, charcoal, sponge, grass, stone, moss, and cloths, being good filters.

For severe cramps, apply hot rocks or pans to the feet and hot fomentations to the stomach.

Men should keep the hair of the head closely cut, save within an inch and a half of the scalp, in every part, repeated on the first of each month, and should wash the

whole scalp plentifully in cold water every morning. They should be made to wear woolen stockings and moderately loose shoes.

Burns and scalds are treated by keeping them from exposure to the air and applying oil, flour, or scraped potatoes.

It is important that men wash their feet well every night (not in the morning), because it aids to keep the skin and nails soft, prevents chafing, blisters, and corns, all of which greatly interfere with their duty.

Good powder is no more a munition of war than good food.

Water can be made almost ice-cool in the hottest weather, by closely enveloping a filled canteen or other vessel with a woolen cloth kept plentifully wetted and exposed.

While on the march, let men lie down the moment they halt for a rest. Every minute spent in that position refreshes more than five minutes standing or loitering about.

It is an excellent plan to have two pairs of shoes to be worn on alternate days, so as to have a perfectly dry pair to put on every morning, allowing the unworn ones to remain in a warm, dry place.

A piece of ice laid on the wrist will often arrest violent bleeding of the nose.

Corns.—Soak the foot fifteen minutes night and morning in quite warm water; then rub two or three drops of sweet-oil into the top of the corn with the end of the finger. Do this patiently for a couple of minutes. Then double a piece of soft buckskin something larger round than a dime, rather oblong in shape. Cut a hole through it large enough to receive the corn and thus attach it to the toe. In less than a week the corn will generally fall out or can easily be pushed out with the finger-nail.

Poisons.—For poisonous acids, such as nitric, oxalic, muriatic, or sulphuric acid, avoid emetics. For nitrate

of silver give plenty of salt water, followed by barley water or gruel.

For strychnine, narcotic poisons, opium, mushrooms, belladonna, &c., give strong emetics at once, pour cold water on the head, neck, and shoulders, place mustard poultices on the feet and keep the person moving about, giving strong coffee as a stimulant.

Emetic.—Drink a charge of gunpowder in a tumblerful of warm water; or soap suds will prove effective.

Wounds.—The most universally safe position, after all stunnings, hurts, and wounds, is that of being placed on the back, the head being elevated 3 or 4 inches only, aiding, more than anything else can do, to equalize and restore the proper circulation of the blood.

Incised wounds, such as are made by a sword or knife, should be carefully cleansed, all extraneous substances removed, the edges brought together, adhesive plaster applied, and the muscles nearly relaxed.

Punctured wounds, such as are made by bayonets, pointed rocks, &c., very often excite inflammation in their vicinity, cause formation of matter under the fascia, and frequently result in hemorrhage. The wounded part should be kept at rest, all subcutaneous oozing of the blood prevented, and an exit made for the discharge. If suppuration sets in, an incision should be made at once in order to let out the pus. Probing in search of extraneous matter is very hurtful.

Lacerated wounds, such as are inflicted by blunt and obtuse bodies, are invariably attended with severe pains, are slow in healing, and are very liable to gangrene. They should be thoroughly cleansed, all foreign bodies removed, and the flaps of torn skin replaced as far as possible. A good poultice and disinfectant should be applied to the wound.

Contused wounds, such as are produced by any blows without breaking the skin, should be attended to with-

out delay, the parts restored to the normal state by a few days of rest, and some stimulating liniment applied.

For a contusion of the head, apply cold water, administer cathartics, make the diet light, take no stimulants, and remain quiet.

For scalp wounds, cleanse the exposed surfaces and replace the torn scalp—the parts will generally heal; if abscesses form they should be evacuated by timely incisions.

In the treatment of wounds the diet should be carefully attended to. In cases like a wounded lung it is necessary to reduce the patient to nearly a state of starvation.

The most excruciating pains from shots are readily relieved by the hyperdermic injection of a solution of morphia. Ice, if procurable, will subdue inflammatory symptoms.

For wasp and scorpion stings, &c., extract the sting, if it remains in the wound, and rub acetic acid, the nicotine from a pipe, or chewed tobacco, upon the wound.

Snake-bites.—Tie a string or handkerchief tightly above the wound and apply a caustic ; if you have none, burn the wound deeply with an iron (or a ramrod) heated to a white heat, then use the utmost exertion to prevent the patient giving way to sleep, the usual accompaniment of snake-bites, and which often ends in death.

The Western mountaineers place great dependence on strong whisky. The action of the poison seems to counteract the effects of the whisky, and a very large quantity may be taken without causing intoxication. No time should be lost in administering the spirits.

Hartshorn applied externally and taken internally, in small doses, is a good remedy.

Broken bones.—If the skin is uninjured, a broken arm or leg is not apt to prove serious, but great care must be observed not to injure the skin, as, if the broken bones force their way through the flesh, abscesses are apt to

form and the parts mortify. If a man have either legs or ribs broken, make a stretcher and so carry him, taking care to keep the stretcher as nearly horizontal as possible. "When a man has broken his leg, lay him on the other side, put the broken limb exactly on the sound one, with a little straw between, and tie the two legs together with handkerchiefs."—(Druitt.)

When fractures occur and there are no splints at hand, they must be improvised from such materials as may be found.

If the thigh be fractured, a rifle may be used for a splint, allowing it to pass along the outside of the limb, being secured by bandages around the limb and ankle.

A fracture of the arm may be put up with a bayonet scabbard or with thin bundles of straw or grass. Light pieces of board, bark, or even the soles of shoes or boots are often used for splints. The forearm should be carefully supported in a sling. Often a severe shock or collapse from pain or nervous fear follows the fracture, in which case a stimulant should be administered.

To know how to arrest bleeding is all important, as life may often be saved by promptly adopting simple means.

Bleeding.—If the blood pours or trickles in a steady stream from a wound it is not apt to prove serious, and all that is necessary is to bind the wound tightly with a handkerchief or piece of lint; but if the blood spurts out at regular intervals and is of a bright red color, an artery is wounded and the patient will bleed to death unless the bleeding is stopped. Tie a handkerchief or string tightly above the part; put a stick through the knot and twist it round until the bleeding stops. If there is no doctor to be had, tie a ligature or pad over the wound and slightly loosen the handkerchief. After this keep the wounded limb still, well raised, and cool until the wound is nearly healed.

Blistered feet.—Rub the feet before retiring with spirits mixed with tallow or grease, or soap is good. To keep the feet from blistering, soap the inside of the stocking before putting it on, or rub the feet well with soap. If the feet ache change the stockings, putting what was the right stocking on the left foot and the left on the right. If one foot only hurts, turn the stocking inside out.

Bed sores, a form of gangrene from pressure, appear on the sacrum, elbows, shoulders, and back of head when the patient is constrained to lie for a long time in one position. For treatment, remove pressure as far as possible, wash and remove sloughs if they exist, and apply a soft poultice.

Myrrh, resin, iodine, and other warm astringent applications are good.

Scurvy.—Any vegetable diet cures it—lime juice is good. Keep the body clean and take gentle exercise. Raw meat is said to be excellent.

Mustard poultice.—Two ounces powdered mustard, 2 ounces linseed meal, 8 ounces boiling water.

Charcoal poultice.—One-third ounce charcoal, 2 ounces bread, 1 ounce linseed meal, 8 ounces boiling water.

Suffering from thirst.—Wet the man's clothing and keep them wet. Moisten his lips with water; give only a teaspoonful of water at a time. On the march drink but little of anything. Rinse the mouth out frequently with water, and when drinking take but a swallow or two.

Suffering from hunger.—Two or three mouthfuls every quarter of an hour to a man in the last extremity; broth is the best food.

For suffocation by gases, &c.—Remove the patient to pure air, apply cold water to the face and chest, rub the body lively, give hot coffee or spirits, and endeavor to induce artificial respiration.

TREATMENT OF THE APPARENTLY DROWNED.

[From the Royal National Life-Boat Association method.]

Send immediately for medical assistance, blankets, and dry clothing, and proceed to treat the patient instantly in the open air, whether afloat or ashore, with the face downward and one of the arms under the forehead.

Expose the face, neck, and chest to the air and remove all tight clothing from neck and chest.

Efforts to restore breathing must be commenced immediately by turning the patient on the side, supporting the head, and exciting the nostrils with hartshorn, tickling the throat with a feather, &c.

Rub the chest and face warm, and dash cold and hot water alternately on them.

If after five minutes this proves unsuccessful, stand at the patient's head, grasp the arms just above the elbow, draw the arms gently and steadily upwards above the head, and keep them stretched upwards for two seconds; then turn down the patient's arms and press them gently and firmly for two seconds against the sides of the chest. Continue these movements about fifteen times in minute. As soon as an effort to respire is perceived proceed to promote warmth and circulation. (This last must not be done, beyond removing the wet clothing and drying the skin, until the first appearance of natural breathing.)

Then rub the limbs upwards using flannels, &c. Apply hot flannels, bottles of hot water, heated bricks, &c., to the pit of the stomach, arm-pits, and soles of the feet.

On restoration of life, a teapoonful of warm water should be given, and after power of swallowing has returned, wine, warm brandy, and water, or coffee may be given; put the patient to bed and encourage him to sleep.

Avoid rough usage; do not hold body up by feet; do not allow the body to remain on the back unless the tongue is secured; give the patient abundance of pure, fresh air.

TREATMENT OF FROST-BITES.

[As recommended by the Surgeon-General of the Marine Hospital Service.]

(1) Do not bring the patient to the fire, nor bathe the parts in warm water.

(2) If snow be on the ground, or accessible, take a woolen cloth in the hand, place a handful of snow upon it, and gently rub the frozen part until the natural color is restored. In case snow is not at hand, bathe the part gently with a woolen cloth in the coldest fresh-water obtainable, ice-water if practicable.

(3) In case the frost-bite is old, and the skin has turned black or begun to scale off, do not attempt to restore its vitality by friction, but apply carron oil on a little cotton, after which wrap the part loosely in flannel.

(4) In all cases, as soon as the vitality has been restored, apply the carron oil, prepared according to service formula. As it contains opium, do not administer morphia or other opiate.

(5) In the case of a person apparently dead from exposure to cold, friction should be applied to the body and the lower extremities, and artificial respiration practiced as in cases of the apparently drowned. As soon as the circulation appears to be restored, administer spirits and water at intervals of fifteen or twenty minutes until the flesh feels natural. Even if no signs of life appear, friction should be kept up for a long period, as instances are on record of recovery after several hours of suspended animation.

Carron oil (service formula).—Olive oil or linseed oil (raw); lime-water, of each 12 parts; tincture of opium, 1 part; mix.

APPENDIX I.

ARTICLES FOR THE GOVERNMENT OF THE NAVY.

[Extract.]

Appendix I.

ARTICLES FOR THE GOVERNMENT OF THE NAVY.

[Extract.]

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Art. 6. If any person belonging to any public vessel of the United States commits the crime of murder without the territorial jurisdiction thereof, he may be tried by court-martial and punished with death.

Art. 7. A naval court-martial may adjudge the punishment or imprisonment for life or for a stated term at hard labor, in any case where it is authorized to adjudge the punishment of death; and such sentences of imprisonment and hard labor may be carried into execution in any prison or penitentiary under the control of the United States or which the United States may be allowed by the legislature of any State to use; and persons so imprisoned in the prison or penitentiary of any State or Territory shall be subject, in all respects, to the same discipline and treatment as convicts sentenced by the courts of the State or Territory in which the same may be situated.

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Art. 23. All offenses committed by persons belonging to the Navy while on shore shall be punished in the same manner as if they had been committed at sea.

Art. 24. No commander of a vessel shall inflict upon a commissioned or warrant officer any other punishment than private reprimand, suspension from duty, arrest, or confinement, and such suspension, arrest, or confinement shall not continue longer than ten days, unless a further

period is necessary to bring the offender to trial by a court-martial; nor shall he inflict, or cause to be inflicted upon any petty officer, or person of inferior rating, or marine, for a single offense, or at any one time, any other than one of the following punishments, namely:

(1) Reduction of any rating established by himself.

(2) Confinement, with or without irons, single or double, not exceeding ten days, unless further confinement be necessary in the case of a prisoner to be tried by court-martial.

(3) Solitary confinement, on bread and water, not exceeding five days.

(4) Solitary confinement not exceeding seven days.

(5) Deprivation of liberty on shore.

(6) Extra duties.

No other punishment shall be permitted on board of vessels belonging to the Navy, except by sentence of a general or summary court-martial. All punishments inflicted by the commander, or by his order, except reprimands, shall be fully entered upon the ship's log.

ART. 25. No officer who may command by accident, or in the absence of the commanding officer, except when such commanding officer is absent for a time by leave, shall inflict any other punishment than confinement.

ART. 26. Summary courts-martial may be ordered upon petty officers and persons of inferior ratings by the commander of any vessel, or by the commandant of any navy-yard, naval station, or marine barracks to which they belong, for the trial of offenses which such officer may deem deserving of greater punishment than such commander or commandant is authorized to inflict, but not sufficient to require trial by a general court-martial.

ART. 27. A summary court-martial shall consist of three officers not below the rank of ensign, as members, and of a recorder. The commander of a ship may order any officer under his command to act as such recorder.

ART. 28. Before proceeding to trial the members of a summary court-martial shall take the following oath or affirmation, which shall be administered by the recorder: "I, A. B., do swear (or affirm) that I will well and truly try, without prejudice or partiality, the case now depending according to the evidence which shall be adduced, the laws for the government of the Navy, and my own conscience." After which the recorder of the court shall take the following oath or affirmation, which shall be administered by the senior member of the court. "I, A. B., do swear (or affirm) that I will keep a true record of the evidence which shall be given before this court and of the proceedings thereof."

ART. 29. All testimony before a summary court-martial shall be given orally, upon oath or affirmation, administered by the senior member of the court.

ART. 30. Summary courts-martial may sentence petty officers and persons of inferior ratings to any one of the following punishments, namely:

(1) Discharge from the service, with bad-conduct discharge; but the sentence shall not be carried into effect in a foreign country.

(2) Solitary confinement, not exceeding thirty days, in irons, single or double, on bread and water, or on diminished rations.

(3) Solitary confinement, in irons, single or double, not exceeding thirty days.

(4) Solitary confinement not exceeding thirty days.

(5) Confinement not exceeding two months.

(6) Reduction to next inferior rating.

(7) Deprivation of liberty on shore on foreign station.

(8) Extra police duties, and loss of pay, not to exceed three months, may be added to any of the above-mentioned punishments.

ART. 31. A summary court-martial may disrate any rated person for incompetency.

ART. 32. No sentence of a summary court-martial shall be carried into execution until the proceedings and sentence have been approved by the officer ordering the court, and by the commander-in-chief, or, in his absence, by the senior officer present. And no sentence of such court which involves loss of pay shall be carried into execution until the proceedings and sentence have been approved by the Secretary of the Navy.

ART. 33. The officer ordering a summary court-martial shall have the power to remit, in part, or altogether, but not to commute, the sentence of the court. And it shall be his duty either to remit any part or the whole of any sentence the execution of which would, in the opinion of the surgeon or senior medical officer on board, given in writing, produce serious injury to the health of the person sentenced; or to submit the case again without delay to the same or to another summary court-martial which shall have power, upon the testimony already taken, to remit the former punishment, and to assign some other of the authorized punishments in the place thereof.

ART. 34. The proceedings of summary courts-martial shall be conducted with as much conciseness and precision as may be consistent with the ends of justice, and under such forms and rules as may be prescribed by the Secretary of the Navy, with the approval of the President; and all such proceedings shall be transmitted in the usual mode to the Navy Department.

ART. 35. Any punishment which a summary court-martial is authorized to inflict may be inflicted by a general court-martial.

ART. 36. No officer shall be dismissed from the naval service except by the order of the President or by sentence of a general court-martial, and in time of peace no officer shall be dismissed except in pursuance of the sentence of a general court-martial or in mitigation thereof.

ART. 38. General courts-martial may be convened by

the President, the Secretary of the Navy, or the commander-in-chief of a fleet or squadron; but no commander of a fleet or squadron in the waters of the United States shall convene such court without express authority from the President.

ART. 39. A general court-martial shall consist of not more than thirteen nor less than five commissioned officers as members; and as many officers, not exceeding thirteen, as can be convened without injury to the service, shall be summoned on every such court. But in no case, where it can be avoided without injury to the service, shall more than one-half, exclusive of the president, be junior to the officer to be tried. The senior officer shall always preside, and the others shall take place according to their rank.

ART. 40. The president of the general court-martial shall administer the following oath, or affirmation, to the judge-advocate or person officiating as such:

I, A. B., do swear (or affirm) that I will keep a true record of the evidence given to, and the proceedings of, this court; that I will not divulge, or by any means disclose, the sentence of the court until it shall have been approved by the proper authority; and that I will not at any time divulge or disclose the vote or opinion of any particular member of the court, unless required so to do before a court of justice in due course of law.

This oath or affirmation being duly administered, each member of the court, before proceeding to trial, shall take the following oath or affirmation, which shall be administered by the judge-advocate, or person officiating as such:

I, A. B., do swear (or affirm) that I will truly try, without prejudice or partiality, the case now depending, according to the evidence which shall come before the court, the rules for the government of the Navy, and my own conscience; that I will not by any means divulge or disclose the sentence of the court until it shall have been approved by the proper authority; and that I will not at any time divulge or disclose the vote or opinion of any particular member of the court, unless required so to do before a court of justice in due course of law.

ART. 41. An oath, or affirmation, in the following form shall be administered to all witnesses, before any court-martial, by the president thereof:

You do solemnly swear (or affirm) that the evidence you shall give in the case now before this court shall be the truth, the whole truth, and nothing but the truth, and that you will state everything within your knowledge in relation to the charges; so help you God (or, this you do under the pains and penalties of perjury.)

ART. 42. Whenever any person refuses to give his evidence or to give it in the manner provided by these articles or prevaricates, or behaves with contempt to the court, it shall be lawful for the court to imprison him for any time not exceeding two months.

ART. 43. The person accused shall be furnished with a true copy of the charges, with the specifications, at the time he is put under arrest, and no other charges than those so furnished shall be urged against him at the trial, unless it shall appear to the court that intelligence of such other charge had not reached the officer ordering the court when the accused was put under arrest, or that some witness material to the support of such charge was at that time absent and can be produced at the trial; in which case reasonable time shall be given to the accused to make his defense against such new charge.

ART. 44. Every officer who is arrested for trial shall deliver up his sword to his commanding officer, and confine himself to the limits assigned him, on pain of dismissal from the service.

ART. 45. When the proceedings of any general court-martial have commenced, they shall not be suspended or delayed on account of the absence of any of the members, provided five or more are assembled, but the court is enjoined to sit from day to day, Sundays excepted, until sentence is given, unless temporarily adjourned by the authority which convened it.

ART. 46. No member of a general court martial shall, after the proceedings are begun, absent himself there-

from, except in case of sickness, or of an order to go on duty from a superior officer, on pain of being cashiered.

ART. 47. Whenever any member of a court-martial, from any legal cause, is absent from the court after the commencement of a case, all the witnesses who have been examined during his absence must, when he is ready to resume his seat, be recalled by the court, and the recorded testimony of each witness so examined must be read over to him, and such witness must acknowledge the same to be correct, and be subject to such further examination as the said member may require. Without a compliance with this rule, and an entry thereof upon the record, a member who shall have been absent during the examination of a witness shall not be allowed to sit again in that particular case.

ART. 48. Whenever a court-martial sentences an officer to be suspended, it may suspend his pay and emoluments for the whole or any part of the time of his suspension.

ART. 49. In no case shall punishment by flogging, or by branding, marking, or tatooing on the body be adjudged by any court-martial or be inflicted on any person in the Navy.

ART. 50. No person shall be sentenced by a court-martial to suffer death except by the concurrence of two-thirds of the members present, and in the cases where such punishment is expressly provided in these articles. All other sentences may be determined by a majority of votes.

ART. 51. It shall be the duty of a court-martial, in all cases of conviction, to adjudge a punishment adequate to the nature of the offense; but the members thereof may recommend the person convicted as deserving of clemency, and state on the record their reasons for so doing.

ART. 52. The judgment of every court-martial shall be authenticated by the signature of the president, and of

every member who may be present when said judgment is pronounced, and also of the judge-advocate.

ART. 53. No sentence of a court-martial, extending to the loss of life or the dismissal of a commissioned or warrant officer, shall be carried into execution until confirmed by the President. All other sentences of general court-martial may be carried into execution on confirmation of the commander of the fleet or officer ordering the court.

ART. 54. Every officer who is authorized to convene a general court-martial shall have power, on revision of its proceedings, to remit or mitigate, but not to commute, the sentence of any such court which he is authorized to approve and confirm.

ART. 55. Courts of inquiry may be ordered by the President, the Secretary of the Navy, or the commander of a fleet or squadron.

ART. 56. A court of inquiry shall consist of not more than three commissioned officers as members, and of a judge-advocate or person officiating as such.

ART. 57. Courts of inquiry shall have power to summon witnesses, administer oaths, and punish contempts in the same manner as courts-martial; but they shall only state facts and shall not give their opinion, unless expressly required so to do in the order for convening.

ART. 58. The judge-advocate, or person officiating as such, shall administer to the members the following oath or affirmation:

You do swear (or affirm) well and truly to examine and inquire, according to the evidence, into the matter now before you without partiality.

After which the president shall administer to the judge-advocate, or person officiating as such, the following oath or affirmation:

You do swear (or affirm) truly to record the proceedings of this court, and the evidence to be given in the case in hearing.

ART. 59. The party whose conduct shall be the subject of inquiry, or his attorney, shall have the right to cross-examine all the witnesses.

ART. 60. The proceedings of courts of inquiry shall be authenticated by the signature of the president of the court and of the judge-advocate, and shall, in all cases not capital, nor extending to the dismissal of a commissioned or warrant officer, be evidence before a court-martial, provided oral testimony cannot be obtained.

APPENDIX II.

MISCELLANEOUS.

Appendix II.

MISCELLANEOUS.

EXPLOSIVES.

Gunpowder has an explosive force varying from 40,000 to 90,000 pounds per square inch.

Nitro-glycerine is an unctuous liquid which explodes by concussion, and extreme pressure—2,000 pounds per square inch—or a temperature exceeding 600° if quickly applied to it. At a temperature below 40° it solidifies in crystals. Its explosive power by weight is four or five times that of gunpowder.

Dynamite is nitro-glycerine 75 parts, absorbed in 25 parts of a siliceous earth. It is insoluble in water, and may be used in wet holes. It congeals at 40°, is rendered ineffective at 212°, and has an explosive force by weight of three times that of gunpowder.

Gun-cotton is insoluble in water, and has an explosive force by weight of about three times that of gunpowder. It may be detonated in a wet state by a small quantity of dry material.

Dualin is nitro-glycerine absorbed by Schultz's powder.

Ionite is nitrated gun-cotton, and is known as cotton powder. It is produced in a granulated form.

Lithofracteur is a nitro-glycerine compound, in which a portion of the base or absorbent material is made explosive by the admixture therein of nitrate of baryta and charcoal.

Cellulose dynamite is where gun-cotton is used as the absorbent for nitro-glycerine. It will explode frozen dynamite, and is more sensitive to percussion than it.

MENSURATION AND USEFUL FORMULÆ.

Circles.—Their areas are to one another as the squares of their diameters.

Circumference = diameter × 3.1416.

Diameter = circumference ÷ 3.1416.

Area of a circle = diameter ^{2} × .7854.

Area of a triangle = ½ base × perpendicular height.

Area of a parallelogram = length × height.

Surface of a sphere = diameter ^{2} × 3.1416 = diameter × circumference.

Volume of a sphere = diameter ^{3} × .5236.

Surface of a cone = area of base + circumference of base × ½ slant height.

Volume of a cone = area of base × ⅓ perpendicular height.

Surface of a cylinder = area of both ends + length × circumference.

Volume of a cylinder = area of one end × length.

The cubic contents of boxes, rooms, &c., are arrived at by dividing them into triangular and rectangular figures, and multiplying the area of such by the height.

The volume of a *prismoid* = (sum of areas extreme sections + four times the middle section) ⅙ the distance between the extreme sections.

This formula is of very extensive application, being used to determine volume of earth-work in railroad cuttings and embankments; also used in estimating work on field fortifications.

PHYSICAL MEMORANDA.

1 cubic foot water = 62.5 pounds.

1 cubic foot sea-water = 64.25.

Weight of sea-water = weight of fresh water × 1.028.

Air is 840 lighter than water.

The pulse, in health, beats from seventy-two to seventy-five times in a minute.

Velocity of sound through the air is about 1,142 feet, and through water about 4,950 feet per second.

Velocity of falling bodies.—N = number of seconds in falling; S = space fallen through, in feet; V = velocity in feet per second acquired in N seconds; then, $V = N \times 32.166$ and $S = N^2 \times 16.033$.

Thermometer.—To convert Centigrade or Reaumur into Fahrenheit, let C, R, and F represent degrees in each, respectively:

$F = C \times 1.8 + 32$; $= R \times 2.25 + 32$: $C = (F - 32)\ .5555$: $R = (F - 32)\ .4444$.

To determine the height of a mountain by means of a thermometer (Fahr.):

Let T = temperature of boiling water at any station, deducted from 212 degrees, and H = the height in feet of the station above the sea. Boil some water and ascertain T by means of the thermometer, then $H = 520\ T + T^2$.

PILING OF SHOT AND SHELL.

Let S = number in pile, n number of balls on one side of base, and $(m + 1)$ number of balls in upper layer (of an oblong pile).

Triangular pile:

$$S = \frac{n\ (n+1),\ (n+2)}{6}$$

Square pile:

$$S = \frac{n\ (n+1),\ (2n+1)}{6}$$

Oblong pile:

$$S = \frac{n\ (n+1),\ (1+2n+3m)}{6}$$

Incomplete pile.—Compute number of balls it would contain if complete and the number that would be required to complete it; the excess of the former over the latter will be the number of balls in the pile.

STRENGTH OF MATERIALS.

If the depth of a beam be doubled, other things equal, its strength will be increased 4 times; if its breadth be doubled, other things equal, its strength will be doubled.

By increasing the distance between the supports the strength of a beam is decreased in the same ratio. Half the distance between the supports will enable a beam to bear twice the load.

The strength of round timber is about one-half that of square timber whose sides equal the diameter of the round timber.

The approximate weight of rope in pounds per fathom $=\frac{C^2}{4}$, in which C is the circumference in inches.

The safe-working load, in tons, which a new rope will bear $=\frac{C^2}{7}$; if the rope is worn divide by 8 in place of 7.

MISCELLANEOUS.

1 (standard) gallon	cubic inches	231
1 (standard) bushel	do	2. 150. 42
1 cubic foot	gallons	7. 4805
1 bushel	do	9. 30918
1 cord of wood	cubic feet	128
1 barrel (measures, 17 inches at the head, 19 inches at the bung, and is 28 inches long)	cubic inches	7, 689
1 English mile	yards	1, 760
1 Irish mile	do	2, 240
1 Scotch mile	do	1, 984
1 Prussian mile	do	8, 238
1 Italian mile	do	1, 093
1 Swedish mile	do	11, 703
1 Swiss mile	do	8, 548
1 Dutch mile	do	8, 101
1 Arabian mile	do	2, 148
1 Chinese mile	do	609
1 verst (Russia)	do	1, 167
1 legua (Spain)	do	7, 418
1 kilometer (France)	do	1, 093

METRIC SYSTEM.

	Exactly.	Approximate equivalent.
Meter.....inches..	39.37079	A yard and a tenth.
Decimeter. ... .. do ..	3.937	Say 4 inches.
Centimeter.....do ..	0.3937	Rather less than one-half inch.
Millimeter ..... do....	0.0394	Twenty-fifth of an inch.
Hectometer .....miles..	0.06214	Half a furlong; 4 hectometers = one-fourth mile.
Kilometer.....do....	0.62138	5 furlongs; 8 kilometers = 5 miles.
Hectare .... acres..	2.471	Nearly 2½ acres.
Are.....poles..	3.954	4 poles.
Centiare.. square yards..	1.96	1⅕ square yards.
Decigram .....grains..	1.543	1½ grains.
Gram.....do ...	15.4323	28⅓ to the ounce.
Decagram ... ounce..	0.353	One-third ounce.
Hectogram .....do	3.527	3½ ounces avoirdupois.
Kilogram .....pounds .	2.2046	In trade a kilogram is reckoned 10 per cent. more than 2 pounds.

RATES OF POSTAGE.

Letters, &c., in the United States.

Mail letters, 2 cents each 1 ounce.

Drop letters at letter-carrier offices, 2 cents each 1 ounce.

Drop letters at non-letter-carrier offices, 1 cent each 1 ounce.

Drawings, plans, designs, and all matter sealed against inspection, 2 cents each 1 ounce or fractional ounce.

Registered letters, 10 cents in addition to the proper postage.

Transient newspapers, 1 cent each 4 ounces.

Third-class matter.—Books (printed and blank), circulars, other printed matter, proof-sheets, corrected proof-sheets and manuscript copy accompanying same, valentines, heliotypes, chromos, posters, lithographs, stereoscopic views, 1 cent each 2 ounces.

Newspapers (except weeklies to subscribers), circulars,

and periodicals, not 4 ounces in weight, deposited in letter-carrier offices for local delivery, 1 cent each.

Fourth-class matter.—Printed envelopes in quantity, blank bills, letter-heads, blank cards, flexible patterns, plain envelopes and letter paper, sample cards, merchandise, models, sample ores, metals, minerals, seeds, cuttings, bulbs, roots, not exceeding 4 pounds in weight, 1 cent each ounce or fraction of ounce.

First, third, and fourth class matter may be registered at 10 cents each package, in addition to regular postage.

Postage to foreign countries.

Countries.	Letters not exceeding one-half ounce.	Newspapers per each 2 ounces.
	Cents.	*Cents.*
Africa, west coast, British possessions	*5	1
Aspinwall	*5	1
New South Wales, Victoria, Queensland	12	2
Australia, via San Francisco	5	2
Austria	*5	1
Belgium	*5	1
Bermuda, via New York	*5	1
Brazil	*5	1
Newfoundland	*5	1
Cape Good Hope, British mail	*15	3
Chili, Ecuador, and Peru	*5	1
China, via San Francisco	*5	1
China, via England	*13	4
Cuba	*5	1
Denmark	*5	1
France and colonies	*5	1
Germany	*5	1
Great Britain and Ireland	*5	1
Holland	*5	1
India, British, via Brindisi	*5	1
Italy	*5	1
Japan, via San Francisco	*5	1
Liberia, via Southampton	*5	1
Mexico	*5	1
Norway and Sweden	*5	1
Portugal	*5	1
Russia	*5	1
Sandwich Islands	5	1
Shanghai, via San Francisco	5	2
Spain	*5	1
Switzerland	*5	1
Turkey—Europe and Asia	*5	1
Venezuela	*5	1
West Indies	*5	1

The asterisk (*) indicates that the postage may be prepaid or not.

Rates on money-orders.

	Rate.
In United States:	
Postal notes under $5	$0 03
Orders not exceeding $10	08
$10 to $15	10
$15 to $30	15
$30 to $40	20
$40 to $50	25
$50 to $60	30
$60 to $70	35
$70 to $80	40
$80 to $100	45
To Great Britain or Ireland:	
Not exceeding $10	25
$10 to $20	50
$20 to $30	70
$30 to $40	85
$40 to $50	1 00
To German Empire, France, Italy, Canada, &c.:	
Not exceeding $10	15
$10 to $20	30
$20 to $30	45
$30 to $40	60
$40 to $50	75

Values of foreign money in United States currency.

Country.	Monetary unit.	Standard.	Value in United States money.	Standard coin.
Argentine Republic	Peso-fuerte	Silver (about)	$1 00.0	
Australia				(See Great Britain.)
Austria	Florin	Silver	40.7	
Belgium	Franc	Gold and silver	19.3	
Bolivia	Boliviano	Silver	82.3	5, 10, and 20 francs.
Brazil	Milreis of 1,000 reis	Gold	54.6	Boliviano.
British possessions in North America.	Dollar	do	1 00.0	
Bogota	Peso	Silver	96.5	
Canada				(See Great Britain.)
Central America	Dollar	Silver	93.5	
Chili	Peso	Gold and silver	91.2	Condor, doubloon, and escudo.
China	Tael	Silver	1 38.0	
Cuba	Peso	Gold and silver	93.2	$\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{2}$, and 1 doubloon.
Denmark	Crown	Gold	26.8	10 and 20 crowns.
Ecuador	Peso	Silver	82.3	Peso.
Egypt	Piaster	Gold	04.9	5, 10, 25, 50, and 100 piasters.
France	Franc	Gold and silver	19.3	5, 10, and 20 francs.
Great Britain	Pound sterling	Gold	4 86.6$\frac{1}{2}$	$\frac{1}{2}$ sovereign and sovereign.
Greece	Drachma	Gold and silver	19.3	5, 10, 20, 50, and 100 drachmas.
German Empire	Mark	Gold	23.8	5, 10, and 20 marks.
India	Rupee of 16 annas	Silver	39.0	
Italy	Lira	Gold and silver	19.3	5, 10, 20, 50, and 100 lire.
Japan	Yen	Silver	88.8	1, 2, 5, 10, and 20 yen; gold and silver yen.

Values of foreign money in United States currency—Continued.

Country.	Monetary unit.	Standard.	Value in United States money.	Standard coin.
Liberia	Dollar	Gold	$1 00.0	
Mexico	....do	Silver	89.4	Peso or dollar, 5, 10, 25, and 50 centavo.
Netherlands	Florin	Gold and silver	40.2	10 and 20 crowns.
Norway	Crown	Gold	26.8	
Perú	Sol	Silver	82.3	Sol.
Portugal	Milreis of 1,000 reis	Gold	1 08.0	2, 5, and 10 milreis.
Russia	Rubles of 100 copecks	Silver	65.8	¼, ½, and 1 rouble.
Sandwich Islands	Dollar	Gold	1 00.0	
Spain	Peseta of 100 centimes	Gold and silver	19.3	5, 10, 20, 50, and 100 pesetas.
Sweden	Crown	Gold	26.8	10 and 20 crowns.
Switzerland	Franc	Gold and silver	19.3	5, 10, and 20 francs.
Tripoli	Mahbub of 20 piasters	Silver	74.3	
Turkey	Piaster	Gold	04.4	25, 50, 100, 250, and 500 piasters.
United States of Colombia.	Peso	Silver	82.3	Peso.
Urugnay	Patacon	Silver	94.9	
Venezuela	Bolivar	Gold and silver	19.3	5, 10, 20, 50, and 100 Bolivar.

RANGE TABLES.*

Class of gun, 3-inch B. L. R. (howitzer) 350 pounds.

Charge of powder ..... 12 ounces, cannon.
Kind of projectile ..... shell.
Weight of projectile ..... 7 pounds, filled.
Permanent angle of deflection for tangent sight ..... 2° 00′ 00″.
Distance between sights ..... 13.75 inches.
Angle of jump ..... 0° 55′.
Initial velocity of shell ..... 1,179 ft. sec.

Range.	Elevation.	Time of flight.	Drift.	Marks on the sight bar.
Yards.	° ′ ″	*Secs.*	*Yards.*	*Inches.*
100	−0 21 00	0.30	0.02	−0.09
200	−0 06 00	0.60	0.07	−0.03
240	0 00 00	0.72	0.11	0.00
300	+0 09 00	0.90	0.16	+0.03
400	0 34 36	1.20	0.25	0.09
500	0 40 48	1.50	0.46	0.16
600	0 57 36	1.82	0.69	0.23
610	1 00 00	1.88	0.72	0.24
700	1 14 24	2.14	0.92	0.30
800	1 31 12	2.46	1.19	0.37
900	1 48 36	2.78	1.50	0.44
960	2 00 00	2.96	1.70	0.48
1,000	2 06 36	3.10	1.84	0.51
1,100	2 24 06	3.44	2.22	0.58
1,200	2 43 12	3.78	2.66	0.65
1,292	3 00 00	4.10	3.08	0.72
1,300	3 01 48	4.13	3.13	0.72
1,400	3 20 24	4.50	3.63	0.80
1,500	3 39 00	4.89	4.17	0.88
1,600	3 58 48	5.28	4.77	0.96
1,605	4 00 00	5.29	4.80	0.97
1,700	4 19 12	5.68	5.42	1.04
1,800	4 39 36	6.11	6.11	1.12
1,900	5 00 00	6.54	6.84	1.20
2,000	5 22 12	6.98	7.65	1.29
2,100	5 46 48	7.42	8.55	1.38
2,143	6 00 00	7.62	8.97	1.43
2,200	6 12 00	7.87	9.56	1.48
2,300	6 39 00	8.33	10.58	1.58
2,374	7 00 00	8.69	11.48	1.67
2,400	7 06 00	8.79	11.69	1.69
2,500	7 33 00	9.25	12.83	1.80
2,600	8 00 00	9.71	14.07	1.91
2,700	8 27 00	10.28	14.34	2.02
2,800	8 54 00	10.65	16.67	2.14

* Ordnance instructions, 1880.

Class of gun, &c.—Continued.

Range.	Elevation.	Time of flight.	Drift.	Marks on the sight bar.
Yards.	° ′ ″	*Secs.*	*Yards.*	*Inches.*
2,810	9 00 00	10.70	16.81	2.17
2,900	9 21 36	11.12	18.07	2.26
3,000	9 49 12	11.59	19.52	2.38
3,033	10 00 00	11.76	20.02	2.43
3,100	10 17 24	12.06	21.04	2.50
3,200	10 45 36	12.54	22.60	2.62
3,250	11 00 00	12.80	23.43	2.68
3,300	11 13 48	13.03	24.25	2.74
3,400	11 42 00	13.52	25.93	2.86
3,460	12 00 00	13.82	26.97	2.93
3,500	12 10 12	14.02	27.67	2.98
3,600	12 38 24	14.52	29.47	3.10
3,674	13 00 00	14.89	30.85	3.18
3,700	13 06 36	15.02	31.32	3.22
3,800	13 34 48	15.53	33.22	3.34
3,878	14 00 00	15.92	34.87	3.44
3,900	14 07 12	16.05	35.33	3.47
4,000	14 41 24	16.58	37.58	3.61
4,050	15 00 00	16.85	38.80	3.68
4,100	15 19 12	17.14	40.03	3.77
4,200	16 00 00	17.70	42.68	3.94
4,300	16 43 12	18.28	45.49	4.12
4,338	17 00 00	18.50	46.63	4.18
4,400	17 28 48	18.88	48.49	4.32
4,469	18 00 00	19.30	50.63	4.47
4,500	18 14 24	19.48	51.56	4.53
4,593	19 00 00	20.05	54.44	4.75
4,600	19 04 12	20.08	54.66	4.76
4,700	19 58 48	20.69	57.76	5.00
4,704	20 00 00	20.71	57.80	5.01

Class of gun, 3-inch B. L. R. (howitzer) 500 pounds.

Charge of powder ..... 16 ounces, cannon.
Kind of projectile ..... shell.
Weight of projectile ..... 7 pounds, filled.
Permanent angle of deflection for tangent sight ..... 2° 40′ 00″.
Distance between sights ..... 19.06 inches.
Angle of jump ..... 0° 29′ 25″.
Initial velocity ..... 1,246 ft. sec.

Range.	Elevation.	Time of flight.	Drift.	Marks on the sight bar.
Yards.	° ′ ″	*Secs.*	*Yards.*	*Inches.*
100	−0 05 24	.31	.015	−0.02
200	+0 07 48	.62	.059	+0.05
300	0 21 36	.93	.128	0.12
400	0 35 24	1.24	.237	0.19
500	0 49 12	1.56	.374	0.26
579	1 00 00	1.85	8.71	0.33
600	1 03 00	1.88	.546	0.34
700	1 16 48	2.20	.751	0.42
800	1 31 12	2.51	.995	0.50
900	1 45 36	2.83	1.27	0.58
1,000	2 00 00	3.15	1.59	0.66
1,100	2 14 24	3.47	1.95	0.74
1,200	2 28 48	3.79	2.36	0.82
1,300	2 43 48	4.11	2.82	0.90
1,400	2 58 48	4.44	3.32	0.99
1,401	3 00 00	4.50	3.40	1.00
1,500	3 14 24	4.78	3.88	1.08
1,600	3 30 36	5.12	4.47	1.17
1,700	3 47 24	5.46	5.11	1.26
1,762	4 00 00	5.61	5.73	1.33
1,800	4 04 48	5.80	5.89	1.36
1,900	4 23 24	6.14	6.67	1.47
2,000	4 43 12	6.49	7.54	1.58
2,082	5 00 00	6.70	8.45	1.67
2,100	5 03 36	6.85	8.57	1.69
2,200	5 25 12	7.22	9.65	1.81
2,300	5 46 46	7.59	10.81	1.93
2,348	6 00 00	7.80	11.43	2.00
2,400	6 10 24	7.98	12.03	2.06
2,500	6 36 00	8.37	13.32	2.20
2,592	7 00 00	8.70	14.68	2.33
2,600	7 00 36	8.76	14.70	2.34
2,700	7 25 24	9.16	16.13	2.48
2,830	7 49 48	9.57	17.66	2.62
4,846	8 00 00	9.75	18.45	2.68
2,900	8 15 00	9.98	19.24	2.76
3,000	8 40 12	10.40	20.90	2.90
3,083	9 00 00	10.75	22.46	3.02
3,100	9 06 00	10.82	22.66	3.05
3.200	9 31 48	11.25	24.55	3.20

Class of gun, &c.—Continued.

Range.	Elevation.	Time of flight.	Drift.	Marks on the sight bar.
Yards.	° ′ ″	*Secs.*	*Yards.*	*Inches.*
3,300	9 59 24	11.69	26.51	3.35
3,305	10 00 00	11.76	26.73	3.36
3,400	10 27 00	12.13	28.53	3.50
3,500	10 55 12	12.59	30.71	3.66
3,520	11 00 00	12.67	30.83	3.71
3,600	11 24 00	13.05	32.97	3.83
3,700	11 54 00	13.53	35.36	4.00
3,720	12 00 00	13.63	36.02	4.06
3,800	12 25 12	14.01	37.91	4.18
3,900	12 57 00	14.51	40.55	4.37
3,912	13 00 00	14.57	40.98	4.41
4,000	13 29 24	15.03	43.27	4.56
4,090	14 00 00	15.51	46.00	4.75
4,100	14 01 48	15.57	46.17	4.76
4,200	14 36 36	16.12	39.21	4.97
4,260	15 00 00	16.46	51.35	5.11
4,300	15 12 00	16.68	52.41	5.18
4,400	15 46 48	17.25	55.73	5.40
4,427	16 00 00	17.38	56.83	5.47
4,500	16 24 00	17.83	59.18	5.62
4,587	17 00 00	18.35	62.46	5.83
4,600	17 01 48	18.42	62.75	5.85
4,700	17 41 24	19.05	66.52	6.09
4,740	18 00 00	19.22	68.22	6.20
4,800	18 21 06	19.68	70.38	6.34
4,891	19 00 00	20.30	74.16	6.57
4,900	19 01 12	20.35	74.38	6.59

Class of gun—Hotchkiss revolving cannon—experiments at Gavre (France), October, 1877.

Weight of projectile (common shell) ..... 16.05 oz.
Charge of powder* ..... 1,234.6 grs. or 2.82 oz.
Initial velocity ..... 439 yds. †
Mean variation in velocity ..... 1.63 yds.
Angle of jump (positive) ..... 4′.

Elevation of gun.	Number of rounds fired.	Mean range.	Mean deflection.	Mean deviation.		Time of flight.
				Longitudinal.	Lateral.	
°		*Yards.*	*Yards.*	*Yds.*	*Yds.*	″
3	20	1,224	6.8 to left.	16.2	1.9	3.5
5	20	1,765	5.4 to left.	16.2	1.5	6.0
8	19	2,359	7.0 to left.	20.1	1.5	8.9
10	20	2,860	35.3 to left.	23.5	3.4	10.9
12	19	3,227	66.5 to left.	23.1	3.3	12.9
15	20	3,312	11.4 to left.	36.9	2.5	14.8
20	19	3,856	56.1 to left.	34.4	5.8	18.8
25	20	4,509	174.4 to left.	34.9	8.1	23.1
35	19	4,892	78.7 to right.	60.5	7.3	29.0

*Ordinary French Ripault cannon.
†The charge of 1,234.6 gr. of Curtis & Harvey's R. F. G.^{2} powder gives an initial velocity of 476 yards.

TABLE OF FIRE.

Table of fire of Springfield rifle, with service cartridge.

Range.	Angle of elevation.	Time of flight.	Remaining velocity.	Energy.	Penetration in white pine.	Mean deviation.	Drift.
Yards.	° ′ ″	*Secs.*	*Feet.*	*Ft.-lbs.*	*Inches.*	*Inches.*	*Inches.*
100	0 17 53	0.25	1,172.0	1,525.4	19.1	1.3	1.29
200	0 31 18	0.50	1 059.2	1,245.9	16.5	2.7	3.0
300	0 44 58	0.75	968.0	1.079.6	14.1	4.2	5.1
400	1 0 32	1.00	932.0	964.6	12.1	5.8	7.8
500	1 17 18	1.25	886.0	871.7	10.6	7.6	11.5
600	1 34 30	1.60	844.5	792.0	9.7	9.5	16.1
760	1 52 36	1.97	806.9	723.0	9.0	11.6	21.9
800	2 12 2	2.37	772.4	662.5	8.3	13.8	28.35
900	2 34 36	2.81	740.7	609.3	7.6	17.0	35.7
1,000	2 58 10	3.29	711.6	562.3	7.0	21.4	43.2

Foreign field guns.

Principal dimensions, &c.	England.		France.		Germany.		Italy.	
	9-pdr.	16-pdr.	8-cm.	9-cm.	8-cm.	9-cm.	7-cm.	9-cm.
Caliber ..... inches.	3	3.6	3.15	3.54	3.09	3.46	2.95	3.43
Weight, including breech-closing apparatus ..... pounds.	672	1,344	935	1,106	858	990	650	1,071
Weight of gun-carriage equipped with gun ..... pounds	2,044	2,957	2,101	2,662	1,898	2,062	1,531	2,390
Service charge of powder do ..	$1\frac{3}{4}$	3	$3\frac{5}{16}$	$4\frac{3}{16}$	$2\frac{3}{4}$	$3\frac{5}{16}$	$1\frac{7}{8}$	$3\frac{3}{16}$
Muzzle velocity ..... feet	1,391	1,350	1,608	1,492	1,525	1,456	1,381	1,490
Effective range ..... yards	3,500	4,200	7,655	7,535	6,196	6,551	3,543	3,500
Number of guns in a battery ...	6	6	6	6	6	6	8	8
Total number of rounds per gun carried by battery	148	100	165	138	154	136	140	131

Foreign field guns—Continued.

Principal dimensions, &c.	Austria.		Spain.		Russia.		
	8-cm.	9-cm.	8-cm.	9-cm.	4-pdr. H. A.	4-pdr. F. B.	9-pdr.
Caliber ..... inches..	2.95	3.43	3.09	3.43	3.43	3.43	4.19
Weight, including breech-closing apparatus ..... pounds..	658	1,071	658	956	802	1,006	1,370
Weight of gun-carriage equipped with gun ..... pounds..	1,685	2,259	.....	.....	1,802	2,114	2,574
Service charge of powder ..... do ..	$2\frac{1}{16}$	$3\frac{5}{16}$	$2\frac{3}{16}$	$3\frac{1}{16}$	3	3	$4\frac{1}{16}$
Muzzle velocity ..... feet..	1,385	1,470	1,493	1,552	1,350	1,452	1,225
Effective range ..... yards..	5,000	5,000	5,468	5,905	7,000	7,000	.....
Number of guns in a battery	8	8	.....	.....	6	8	8
Total number of rounds per gun carried by battery	152	128	.....	.....	165	165	165

Comparative table of recent productions in field artillery.

Principal dimensions, &c.	Woolwich.		Armstrong.		
	13-pdr. M. L.	13-pdr. B. L.	9-pdr. B. L.	13-pdr. B. L.	7-pdr. M. L.
Caliber.....inches.	3	3	3	3	2.5
Weight with breech-closing apparatus..pounds.	896	952	532	929	400
Weight of gun-carriage equipped with gun. pounds.....	2,234	2,382	1,456	2,184	931
Muzzle velocity.....feet.	1,595	1,595	1,530	1,600	1,440

Principal dimensions, &c.	Krupp.			Vavasseur.	
	9.6-cm. B. L.	7.5-cm. B. L.	6.5-cm. B. L.	10-pdr. B. L.	13-pdr. B. L.
Caliber.....inches.	3.78	2.95	2.56	2.95	3.15
Weight with breech-closing apparatus..pounds.	1,375	660	396	1,008	1,064
Weight of gun-carriage equipped with gun, pounds.....	2,563	1,672	794	.....	.....
Muzzle velocity.....feet.	1,443	1,525	1,365	1,673	1,904

Weights and dimensions of muskets of different nations.

	United States.	France.	England.	Austria.	Spain.
Musket:					
Weight, without bayonet.....pounds.	8.38	9.26	8.75	9.04	9.19
Weight, with bayonet.....pounds	9.13	10.49	10.25	10.36	10.47
Length, without bayonet.....inches.	51.9	51.18	49.21	50.39	51.58
Length, with bayonet.....inches.	69.80	72.05	66.93	68.50	73.23
Caliber.....	.45	.433	.45	.421	.433
Rear sight, graduated to.....yards.	1,100	1,968	1,300	.....	1,093

	Holland.	Italy.	Prussia.	Russia.	Switzerland.
Musket:					
Weight, without bayonet.....pounds	9.76	9.26	9.66	9.47	10.14
Weight, with bayonet.....pounds.	11.80	10.82	11.30	10.36	10.80
Length, without bayonet.....inches.	51.97	53.15	53.15	53.15	50.79
Length, with bayonet.....inches.	72.05	75.20	71.65	72.84	70.08
Caliber.....	.433	.407	.433	.42	.409
Rear sight, graduated to.....yards.	.....	1,093	1,750	.....	1,093

Name by which the arm is generally known: United States, Springfield; France, Gras; England, Martini-Henry; Austria, Werndl; Spain, Remington; Holland, Beaumont; Italy, Vetterli; Prussia, Mauser; Russia, Berdan; Switzerland, Vetterli.

Dangerous spaces for a foot soldier (63 *inches*), *with muskets of different nations.*

Distances.	UNITED STATES.			FRANCE.			ENGLAND.			AUSTRIA.					
										Old cartridge.			New cartridge.		
	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.
	Yds.	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*
220 yards	220	69	289	220	80	300	220	72	292	220	69	289	220	80	300
330 "	78	49	127	101	57	158	87	53	140	71	46	117	102	57	159
440 "	43	36	79	52	38	90	50	38	88	43	34	77	52	39	91
550 "	32	29	61	34	28	62	34	30	64	30	25	55	36	31	67
660 "	24	21	45	25	22	47	26	24	50	22	20	42	26	24	50
770 "	19	18	37	20	17	37	21	20	41	16	15	31	21	20	41
880 "	16	15	31	16	14	30	17	16	33	13	12	25	16	16	32
990 "	12	12	24	13	12	25	14	14	28	11	10	21	13	13	26
1,100 "	10	10	20	10	10	20	11	11	22	9	9	18	11	11	22

Dangerous spaces for a foot-soldier (63 *inches*), *with muskets of different nations*—Continued.

Distances.	SPAIN.			HOLLAND.			ITALY.			PRUSSIA.			RUSSIA.			SWITZERLAND.		
	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.	In front.	In rear.	Total.
	Yds.	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*	*Yds.*
220 yards	220	74	294	220	72	292	220	72	292	220	78	298	220	75	295	220	71	291
330 "	89	52	141	77	48	125	82	50	132	97	56	153	94	53	147	74	46	120
440 "	48	37	85	47	36	83	48	37	85	51	38	89	51	38	89	46	35	81
550 "	32	27	59	31	27	58	32	27	59	34	28	62	34	30	64	31	27	58
660 "	23	21	44	22	21	43	23	21	44	25	22	47	26	23	49	22	21	43
770 "	19	16	35	17	16	33	18	17	35	20	17	37	21	19	40	17	16	33
880 "	15	13	28	14	13	27	15	14	29	16	14	30	16	15	31	14	13	27
990 "	12	11	23	11	11	22	12	11	23	13	12	25	13	12	25	11	11	22
1,100 "	10	9	19	9	9	18	10	9	10	19	10	20	11	10	21	9	9	18

*Ordnance allowance of weights going with various naval guns.**

	3-inch breech-loading howitzer (heavy).	3-inch breech-loading howitzer (light).	12-pounder muzzle-loading smooth-bore howitzer (heavy).	12-pounder muzzle-loading smooth-bore howitzer (light).	Gatling (short).
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
How mounted	(†)	(†)	(‡)	(‡)	(§)
Gun	500	320	750	430	139
Carriage	535	455	1,187	654	282
Shells	751	751	.....	.....	.....
Powder	100	75	.....	.....	.....
Equipments, including tanks	287	287	.....	.....	87
One set ammunition with equipments	.....	.....	1,484	1,410	‖2,750
Total weights	2,173	1,888	3,421	2,494	3,258

* Ordnance Instructions, 1880.
† Field, iron.
‡ Field and boat.
§ Field with caisson.
‖ Twenty-five thousand ball cartridges included.

Weights of small-arms ammunition.

Arms.	Caliber.	Powder.	Bullet.	Case.
		Grains.	*Grains.*	
Rifle	.45	70	405	150
Pistol	.50	20	300	.....
Revolver	.38	19½	142	.....

Weight of a package of 20 rifle cartridges, caliber .45, 2 pounds; caliber .50, 2 pounds, 2 ounces.

Weights of small-arms ammunition—Continued.

Kind of cartridge.	Caliber.	No. in one box.	Weight of one box.	Dimensions of one box.
			Lbs.	*Inches.*
Rifle metallic ball	.45	1,000	109½	18 by 14½ by 8⅓
Do	.50	1,000	113	19 by 13 by 8⅓
Navy pistol ball	.50	1,000	80	19½ by 9 by 6⅔
Revolver ball	.38	3,000	105	16¼ by 9⅔ by 9
Rifle blank	.45	1,000	41	17 by 11¼ by 8
Do	.50	1,000	51	18½ by 13 by 8¼

WEIGHT OF SMALL-ARMS, ETC.

	Pounds.
Hotchkiss magazine rifle, caliber .45, fitted with leather sling and loaded with six metallic ball cartridges	9¾
Lee magazine rifle, with magazine	9
Springfield rifle (without bayonet)	8.38
One Navy pistol	2
50 Navy pistols, occupying 1 cubic foot	107
50 battle-axes, occupying 1.9 cubic feet	117
100 buff waist-belts, occupying 1 cubic foot	28
100 pistol cartridge boxes, occupying 1.6 cubic feet	20½
100 cutlasses and scabbards, occupying 6.7 cubic feet	250
100 cutlass frogs, occupying ¾ cubic foot	15
50 pistol frogs, occupying ¾ cubic foot	7

WEIGHT OF INTRENCHING TOOLS.

	Lbs.	oz.
Hand hatchet	1	14
Ax (with handle)	4	8
Shovel	4	12
Spade	6	
Crowbar	4	8
	5	8
Pickax	5	8

WEIGHT OF PROJECTILES.

TABLE I.

Cast-iron balls.

Diameter.	Weight.
Inches.	*Pounds.*
2	1.09
2½	2.13
3	3.68
3½	5.84
4	8.73
4½	12.42
5	17.04
5½	22.68
6	29.45
6½	37.44
7	46.76
7½	57.52
8	69.81
8½	83.73
9	99.40
10	136.35
11	181.48
12	235.65
15	450.28

TABLE II.

Round cast iron (weight of a lineal foot).

Diameter.	Weight.
Inches.	*Pounds.*
2	9.82
2½	15.34
3	22.09
3½	30.07
4	39.27
4½	40.70
5	61.36
5½	74.25
6	88.36
6½	103.70
7	120.26
7½	138.06
8	157.08
8½	177.33
9	198.80
10	245.44
11	296.98
12	353.43
15	552.23

To determine the approximate weight of elongated projectiles ascertain from Table II the weight of the cylindrical portion of the projectile, and add to it half the weight of a solid shot of corresponding diameter taken from Table I.

Officer's equipment for the field.

	Weight.
	Lbs. oz.
Arms and accouterments:	
Revolver (———)	2 8
Ammunition (40 rounds)	1 4
Belt	2
Canteen (filled)	4
Haversack	14
Total	10 10
Articles worn:	
Cap	6½
Blouse	1 4
Trousers	2
Undershirt (knit)	6
Overshirt (flannel)	1
Drawers (flannel)	10
Shoes	2
Socks (woolen)	4
Silk handkerchief	1½
Leggins	10
Total	8 10
Articles carried:	
1 overcoat (without hood)	6
1 blanket (wool)	4 8
1 blanket (rubber)	2 8
1 pair trousers	2
2 pair worsted socks	8
1 pair drawers	10
1 undershirt (knit)	6
2 handkerchiefs	3
2 towels	12
1 comb and brush, 1 clothes brush, 1 tooth brush, 1 pair scissors, 1 metal soap box	1 6
1 watch	6
1 small sponge	3
1 housewife	4
1 journal book	9
1 match box	3
1 roll of lint	3
1 piece of flannel	6
1 tin plate	7
1 tin cup	5
1 knife, fork, and spoon	12
1 India rubber basin	10
Tobacco	.....
Total	23 1

RECAPITULATION.

	Lbs.	oz.
Arms and accouterments	10	10
Articles worn	8	10
Articles carried	23	1
Two days' rations	5	8
Total	47	13

NOTE.—Weight of officer's sword (Navy), 2 pounds 4 ounces; officer's sword (marine), 2 pounds; marine overcoat, 5 pounds (without cape).

Sailor's equipment for the field.

	Weight.			Weight.	
	Lbs.	*oz.*		*Lbs.*	*oz.*
Arms and accouterments:			Articles carried:		
Rifle (Lee magazine)	9		1 pea-jacket	4	8
Bayonet		11	1 undershirt (flannel)		12
Scabbard		8½	1 blanket (wool)	3	7
Canteen (filled)	4		1 blanket (rubber)	2	8
Waist-belt		4½	1 pair socks		5
Two cartridge boxes	1	4	1 towel		6
Ammunition (60 rounds)	6		1 comb		0½
Haversack		14	1 brush		3½
			1 housewife		3
Total	22	10	1 sponge		0½
			1 tin cup		4
Articles worn:			1 knife, fork, and spoon		12
1 cap		4	1 tin plate		7
1 neckerchief		1	1 knife and lanyard		5
1 undershirt (flannel)		12	Tobacco		
1 overshirt (flannel)	1	1			
1 pair pants (cloth)	1	6	Total	14	1½
1 pair drawers		10			
1 pair stockings		5			
1 pair shoes	2	5			
1 pair leggins		10			
Total	7	6			

RECAPITULATION.

	Lbs.	oz
Arms and accouterments	22	10
Articles worn	7	6
Articles carried	14	1
Two days' rations	5	8
Total	49	9

Marine's equipment for the field.

	Weight.	
	Lbs.	*oz*
Arms and accouterments:		
Rifle (Springfield)	8	6
Bayonet		11
Scabbard		8½
Canteen (filled)	4	
Waist-belt		5½
2 cartridge boxes	1	4
Ammunition (60 rounds)	6	
Blanket bag	1	15
Haversack		14
Total	24	
Articles worn:		
1 cap		5½
1 blouse	1	
1 pair trousers	1	13
1 under-shirt (wool)		14½
1 overshirt (flannel)	1	1½
1 pair drawers		12
1 pair stockings		4
1 pair shoes	2	2
Total	8	4½

	Weight.	
	Lbs.	*oz.*
Articles carried:		
1 overcoat	3	7
1 cape	1	8
1 blanket (wool)	4	13
1 blanket (rubber)	2	8
1 undershirt		14½
1 pair socks		4
1 towel		6
1 comb		0½
1 brush		3½
1 housewife		3
1 roll of lint		3
1 box cleaning gear		5
1 sponge		0½
1 tin cup		4
1 knife, fork, and spoon		12
1 tin plate		7
1 knife and lanyard		5
Tobacco		
Total	16	8

RECAPITULATION.

	Lbs.	oz.
Arms and accouterments	24	
Articles carried	16	8
Articles worn	8	5
Two days' rations	5	8
Total	54	5

NOTE.—Weight of a sergeant's sword is 2 pounds 8½ ounces; a musician's sword is 2 pounds 5½ ounces; a bugle is 13 ounces; a drum complete is 7 pounds 4 ounces; a canteen (empty) is 15½ ounces; a helmet is 12 ounces.

Miscellaneous.

Articles.	Weight.		Articles.	Weight.	
	Lbs.	*oz.*		*Lbs.*	*oz.*
1 pocket-book	0	4	1 pair folding compasses	0	1
1 pair gloves		3½	1 protractor		1
Brushes:			1 aneroid (3 inches)		10
Blacking		2½	1 sextant	1	0
Clothes		2½	1 prismatic compass		9
Shaving		¾	1 telescope	2	0
1 razor and case		3	1 pocket dictionary		3¼
1 piece of soap		2	1 note book (5½ by 3½)		4
1 sword-knot		2½	1 map of country		2
1 lanyard		¼	Paper, pens, and envelopes	1	0
1 pair of suspenders		6	1 small bottle ink		8
1 looking-glass		8	1 pocket flask (filled)		4
1 folding chair	5	0	4 small gimlets for pegs		4
1 rubber bucket	1	0			
1 pair canvas shoes	1	0			
1 ball string		2			

RATION TABLE.—*Days of the week upon which the different articles of the Navy ration are required to be issued on board of the vessels of the Navy and the variations authorized to be made in the issues thereof (U. S. Navy Ration Regulations, 1884).*

Days of the week.	Bread.							
	Baked.		Flour.					
					Either.			
	Biscuit.	Soft bread.	Corn-meal.	Oat-meal.	Rye-flour.	Hominy.	Wheat-flour.	Salt pork.
Sunday	1 or		1					
Monday	1						1 [8 oz.]	
Tuesday	1							1
Wednesday	1 or				1 or	1		
Thursday	1						1 [8 oz.]	
Friday	1 or			1				
Saturday	1							1
Total number of rations	7 or 4	and	1	1	1 or	1	2	2
Quantity for each ration	14 oz.	1 lb.	1 lb. or 8 oz.	1 lb. or 8 oz.	1 lb. or 8 oz.	1 lb. or 8 oz.	1 lb. or 8 oz.	1 lb.
Total quantity issued weekly.	6½ lbs. or 3½ lbs.	and	1 lb.	1 lb.	1 lb. or	1 lb.	1 lb.	2 lbs.

Ration table—Continued.

Days of the week.	Beans.	Peas.	Salt beef.	Rice.	Dried fruit.	Butter.	Tomatos.	Preserved meat.	Coffee.
Sunday		1				1		1	1
Monday					1			1	
Tuesday	1								1
Wednesday				1		1		1	
Thursday			1		1				1
Friday						1	1	1	
Saturday	1								1
Total number of rations	2	1	1	1	2	3	1	4	4
Quantity for each ration	½ pt.	½ pt.	1 lb.	8 oz.	2 oz.	2 oz.	6 oz.	12 oz.	2 oz.
Total quantity issued weekly	1pt.=1 lb.	½pt.=½lb.	1 lb.	8 oz.	4 oz.	6 oz.	6 oz.	3 lbs.	8 oz.

Ration table—Continued.

Days of the week.	Either, as preferred.		Sugar.	Pickles.	Molasses.	Vinegar.	Fresh meat.	Vegetables.	
	Tea.	Cocoa.						Fresh.	Canned.
Sunday			1						1
Monday	1 or	1	1			1			
Tuesday			1	1					
Wednesday	1 or	1	1						
Thursday			1		1				1
Friday	1 or	1	1						
Saturday			1	1					
Total number of rations	3 or	3	7	2	1	1			2
Quantity for each ration	½ oz.	2 oz.	4 oz.	½ pt.=4 oz.	½ pt.	½ pt.	1¼ lbs.	1¼ lbs.	6 oz.
Total quantity issued weekly	1½ oz.	or 6 oz.	1¾ lbs.	½ pt.=8oz.	½ pt.	½ pt.			12 oz.

Soft bread, fresh meat, and fresh vegetables may be issued on any days of the week when directed by the commanding officer in accordance with the Navy regulations.

When fresh meat and vegetables are issued no other articles of the ration are to be issued with them except the daily allowance of bread or its substitutes, coffee and tea, or cocoa, sugar, and the weekly allowance of pickles, molasses, and vinegar on their proper days.

Canned vegetables may be issued with fresh meat when fresh vegetables are not procurable.

GUARD REPORT.

Report of a guard mounted at ———, on the ———, and relieved on the ———.

Parole.		Lieutenants.	Sergeants.	Corporals.	Musicians.	Privates.	Total.	Aggregate.	Articles in charge.				Received the foregoing articles. A. B., *Officer of the Guard.*
Countersign.													
Detail.													

LIST OF THE GUARD.

Reliefs and when posted.										Where posted.	Remarks.
First relief from —— to —— and —— to ——.				Second relief from —— to —— and —— to ——.			Third relief from —— to —— and —— to ——.				
No.	Name.	Co.	Bat.	Name.	Co.	Bat.	Name.	Co.	Bat.		

Sergeant: Corporals:

Orderly for commanding officer:

LIST OF PRISONERS.

NOTE.—Name first the prisoners under sentence by G. C. M., commencing with those who have longest to be confined.

No.	Names.	Co.	Bat.	Confined.		Charge.	Sentence.		Sentences	Remarks.
				When.	By whom.		Commenced—	Expires—		

_____ _____,
_____ *Battalion,*
Commanding the Guard.

[FORM OF JOURNAL.]

JOURNAL.

Journal of the march of _____
from _____

Date.	Hour.	Weather.	Distance.	Route.	Remarks.

JOURNAL.

_____, *commanded by*
to _____.

EQUIPMENT SUPPLIES.

Company ——, *Battalion* ——.

Articles.	No.	Remarks.

——, U. S. N.,
Com'd'g Co.

ARMS AND ACCOUTERMENTS.

Company ———, ——— *Battalion.*

Name.	Rate.	Number of—				Ammunition per man, — rounds.
		Rifle.	Cartridge-box.	Haversack.	Canteen.	Remarks.

———, U. S. N.,
Com'd'g Co.

COMPANY TARGET RECORD.

Company ——, —— *Battalion.*

Individual firing. Range. Yards.

Names.	Rate.	Scores.	Per cent. of maximum.

Number of men firing.	Cartridges fired.	Balls struck.			Per cent. of max.	Remarks.
		Bull's eye.	Center.	Inner.		
Volleys by company.						
As skirmishers, from 200 to 600 yards.						

——, U. S. N,
Comd'g Co.

Record of estimating distance practice of — Company, — Battalion, for the —— of ——.

Name.	Rate.	DISTANCES.												Points.	
		True.	Estimated.	True.	Estimated.	True.	Estimated.	True.	Estimated.	True.	Estimated.	True.	Estimated.	Total.	Per cent. of max.

——, U. S. N.,
Comd'g Co.

O

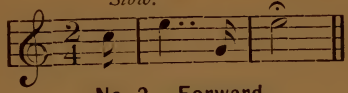
BUGLE CALLS.*

NOTE.—All movements to the right are on the ascending chord: corresponding movements, to the left are corresponding signals on the descending chord.

Changes of gait are all upon the same note.

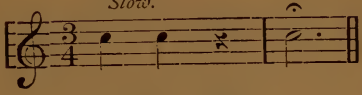
No. 1. Attention.

Slow.

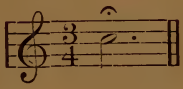


No. 2. Forward.

Slow.

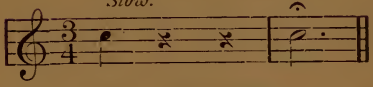


No. 3. Halt.



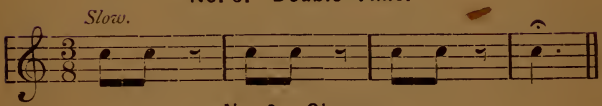
No. 4. Quick Time.

Slow.



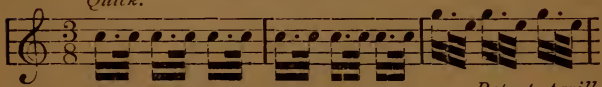
No. 5. Double Time.

Slow.

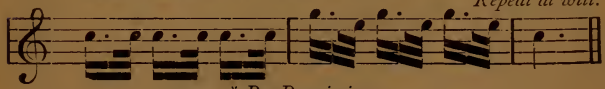


No. 6. Charge.

Quick.

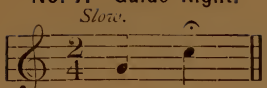


Repeat at will.

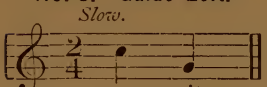


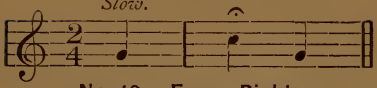
* *By Permission.*

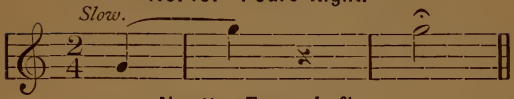
No. 7. Guide Right.



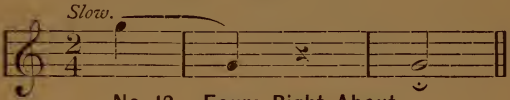
No. 8. Guide Left.



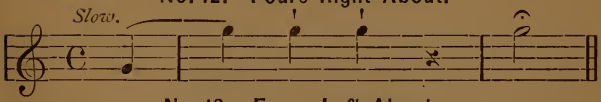
No. 9. Guide Centre.

No. 10. Fours Right.



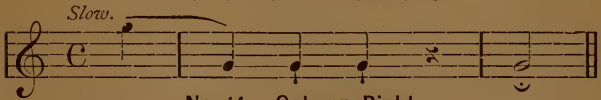
No. 11. Fours Left.



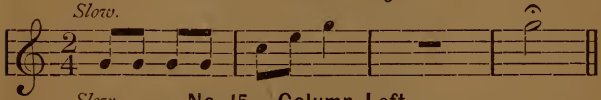
No. 12. Fours Right About.



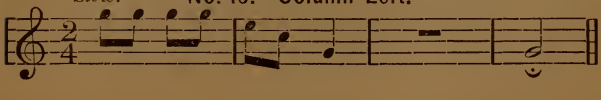
No. 13. Fours Left About.



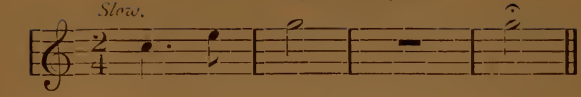
No. 14. Column Right.



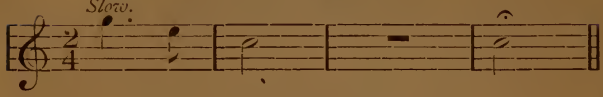
Slow. No. 15. Column Left.



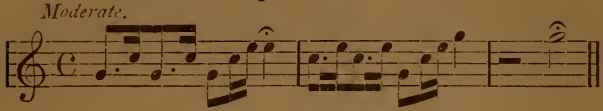
No. 16. Right Oblique.



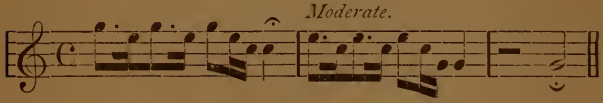
No. 17. Left Oblique.



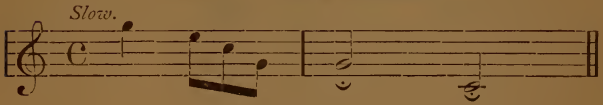
No. 18. Right Front Into Line.



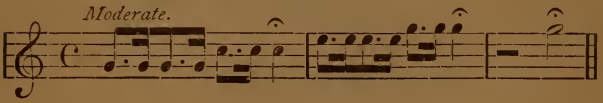
No. 19. Left Front Into Line.



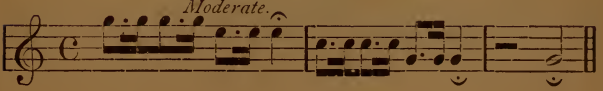
No. 20. Face to the Rear.

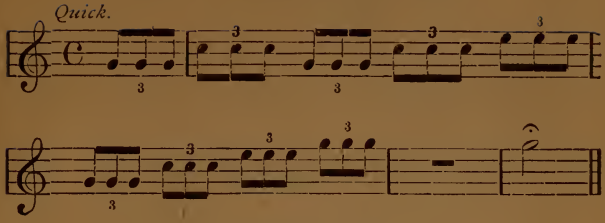
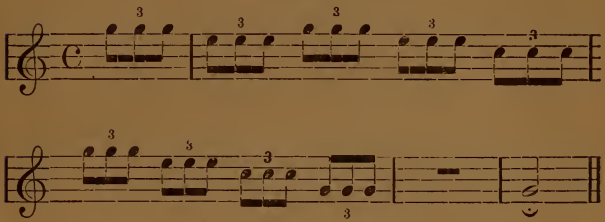


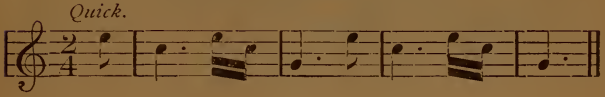
No. 21. On Right Into Line.



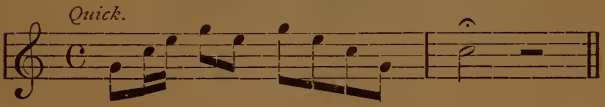
No. 22. On Left Into Line.



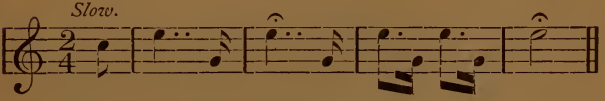
No. 23. Company Right Wheel.

No. 24. Company Left Wheel.

No. 25. Commence Firing.



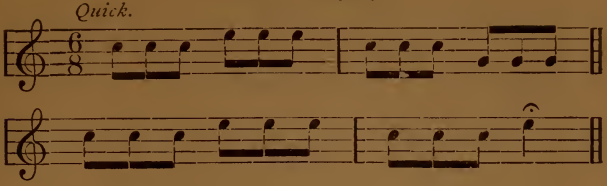
No. 26. Cease Firing.



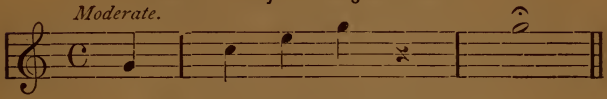
No. 27. Skirmishers Attention.



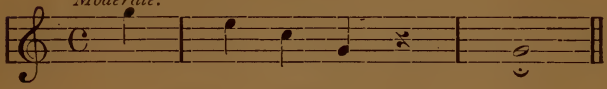
No. 28. Deploy.



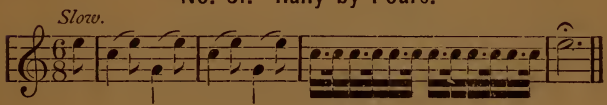
No. 29. By the Right Flank.



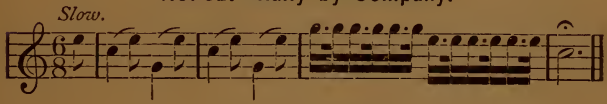
No. 30. By the Left Flank.



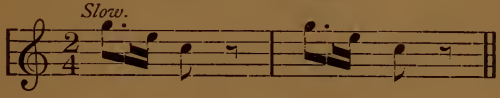
No. 31. Rally by Fours.



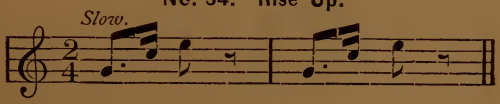
No. 32. Rally by Company.



No. 33. Lie Down.



No. 34. Rise Up.



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Gilman, H. K.

The naval brigade and operations ashore

Rare Bk Room			

OEMCU